Better Crops

The Pocket Book of Agriculture.

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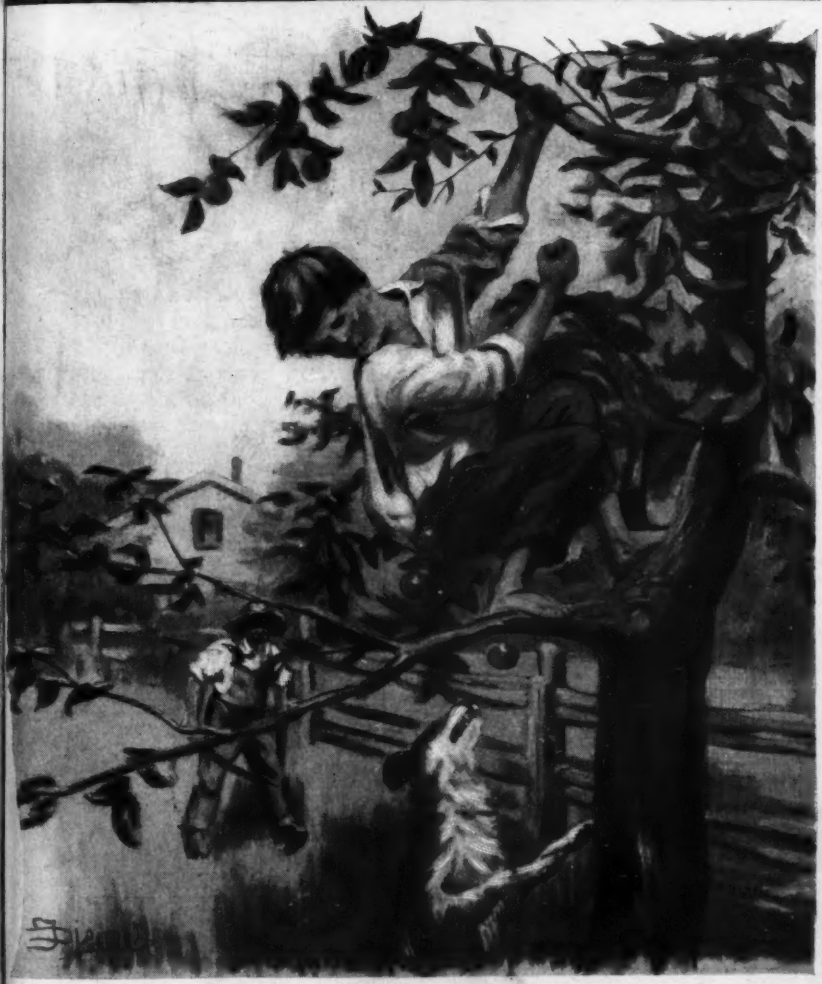

Lead: Change—Wheat Fertilizers for Sassafras Soils—Unending Backs in Farming—Virginia's Fertilizer School—Utah

Improving the grade of *your wheat* –

– is this a matter of luck?

No! There is good evidence★ that the proper use of fertilizers [plus, of course, the right variety of seed and a good cropping system] improves and stabilizes the quality of wheat. This means more money per bushel and greater profit per acre.

If you are not getting a satisfactory, stabilized quality of wheat with small variation in the test weight per bushel, try at least 4% to 6% of potash in your wheat fertilizer this fall.

It will benefit not only your wheat crop but the succeeding crops in your rotation as well, and is especially helpful in getting a good stand of clover or other hay crop following the wheat.

FREE—Write today for folder containing useful, practical information on the profitable use of fall fertilizers.

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POTASH

★ Good Evidence

A fifteen year investigation with fertilizers on wheat in a rotation, conducted by the Delaware Agricultural Experiment Station, demonstrated that a complete fertilizer gave wheat testing 57 to 61 lbs. per bushel (a range of only 4 lbs.); nitrogen and phosphoric acid *without potash* gave wheat testing 50 to 60.5 lbs. per bushel (a range of 10.5 lbs.). Where no fertilizer was used the test weight per bushel varied even more, from 42 to 59 lbs. per bushel (a range of 17 lbs.).

Potash gives best results when used in connection with a sound soil fertility plan. It is our purpose to discuss it from this viewpoint in accord with the fertility programs of the various agricultural extension forces.

Better Crops

The Pocket Book of Agriculture

The Whole Truth—Not Selected Truth

VOLUME VI NUMBER SIX

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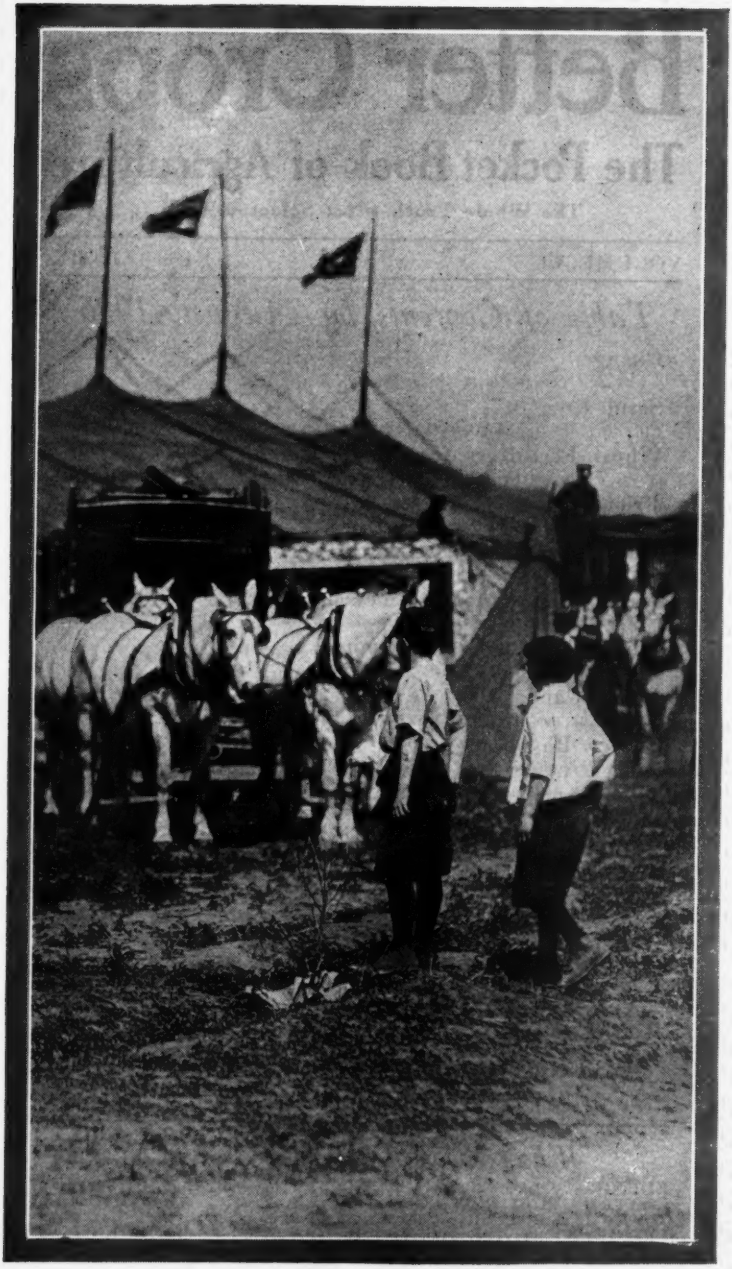

The days of real sport

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VOL. VI NEW YORK, AUGUST, 1926 No. 6

¶ *A few of Jeff's ideas of tomorrow.*

CHANGE

By

Jeff McDermid

ANYONE taking an automobile trip these days must be impressed by the fact that the world is changing. At every turn one is confronted with fresh evidence that "nothing is permanent except change." At each bend of the road, at the crown of every hill, in all the valleys lies proof to him who can observe and think that we are in the midst of a violent upheaval of old ideas; proof that this world is no place for a set mind.

WHEN I was a lad I distinctly remember my grandfather telling my father that the safest investment was traction company bonds. The street cars were then extending their steel tentacles out beyond city limits and taking title to a new opportunity called interurban traction. I remember well grandfather's logical explanation of the perfect safety that lay in traction bonds—"people will always ride."

How true! "People will always ride!" And, as the gasoline automobile had not yet made its advent, how can we blame grandfather for his inability to pierce the veil of the future and foretell the coming of the bus?

People are still riding, but in busses. As we drive through the country we see, alongside the road, car tracks partially covered over with the cruel dirt thrown up by that merciless competitor, the free-running bus, which roars down the road spitting oil on the

grave of what was once a "safe investment."

Those who tied up family fortunes in traction lines are now wondering just how they allowed themselves to get caught. The salvage is slight—it costs more to tear up the tracks and sell the rails for junk than the proceeds of the sale; the power houses may now send out juice for lighting purposes; but the cars lay rotting in sun-baked yards.

And yet today there are those who claim that the bus is here to stay—"nothing can ever replace the railless trolley!"

That in another twenty-five years folks will laugh at the slow, old-fashioned bus that crawls along a bumpy road at only forty miles an hour seems beyond their ken. Yet, an evening's careful study of the progress in air-transportation, projecting by curves into the future the improvements made so far, will prove to any thoughtful student that even the bus must some day take its place in the sun-baked yard along with the street car and peer wistfully into the heavens where men are sailing along at a hundred miles an hour on cool, boundless ways.

MEN seem prone to disbelieve their own eyes and senses—seem unable or unwilling to learn from experiences of the past. The history of the world is a history of change.

"He is less likely to be mistaken who looks forward to a change in the affairs of the world than he who regards them as firm and stable," wrote Guicciardini, and those who remain so close to their own affairs of the moment that they cannot perceive their rightful place in an era of constant and swift change must take the consequences.

Man has no way of telling what the future holds in any field of activity, but this he should be able to foretell: *Whatever Is Will Pass!* And, knowing this, he should plan accordingly, keep his mind free and active and be prepared to swing with the current of the world as it veers down new avenues of endeavor.

A single invention, history tells us, will often change the mode of living for millions of people, making profits for the wise, causing losses for those who look but cannot see.

Edison invented a way to record human speech on discs of soft wax. From this simple, clever laboratory product sprung a giant industry—the making of phonographs. Fortunes were made in the early days. Over ten millions of homes were supplied with machines and records, for a consideration.

Then came the radio! Huge talking machine companies, extended beyond their means and resting their fate on developments of the future, found themselves faced with a worthy competitor which furnished fresh music at no cost except the initial investment, which eliminated the hopping up and down to shut off the phonograph, insert a new needle and place a new record.

The phonograph people overstayed their market—were caught in the swirl of change and found themselves cast up on a barren island. They depended too serenely on "things as they are," and forgot that nothing is permanent but change.

Even in the radio industry itself men were caught—are being caught—through too complacent acceptance of the *NOW AND HERE*. I speak of the battery makers in particular to point a

(*Turn to page* 61)

SCRUB-FREE

By P. M. Farmer

THERE are now 140 purebred bulls in Union county and they have the field all to themselves. This situation is the result of a well planned drive begun a little more than five years ago by L. C. Brewer, at that time county agent. The work has been carried on in the last few years by County Agent R. O. Wilson, with the encouragement and assistance of Wayland Rhoads, field agent in animal husbandry, University of Kentucky.

At the beginning of this year the county had rid itself of all scrub bulls and had only four grades left. With the elimination of the last grade in April, Union county is the first in the United States to have only purebred sires for its cattle herds. In addition to holding first position in the eradication of scrubs and grades, it is third on the honor list in the Better Sires-Better Stock campaign carried on by the Bureau of Animal Industry and the various States. Five hundred and fifty livestock owners in the country have pledged themselves to use only purebred sires for all classes of stock. Only two counties in the country exceed this number.

It is reported that Campbell county in the same State is working hard to achieve the same goal reached by Union county. It has now reduced the number of grade and scrub bulls to 22, and enthusiasts in the movement are expecting to get rid of them by the coming fall.

R. O. Wilson, county agent (left), Wayland Rhoads, animal husbandman, Univ. of Ky., and the last grade bull in Union county, Ky.

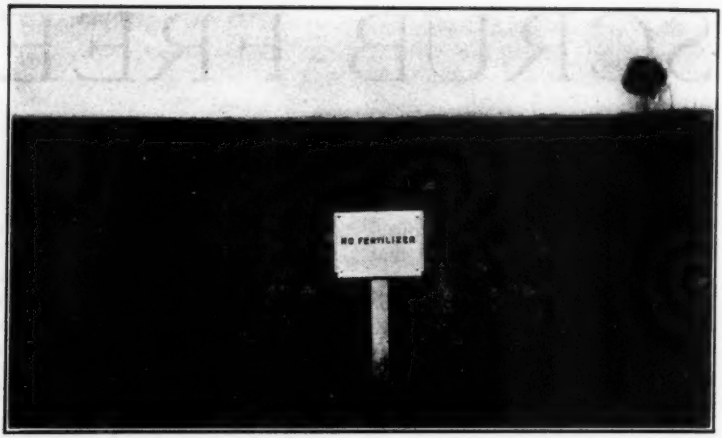


Plate I. No fertilizer treatment. Average annual yield 10.4 *bu. per acre for* 15 *years. Delaware Agricultural Experiment Station*

Wheat Fertilizers

By Geo. L. Schuster

Agronomist, Delaware Agricultural Experiment Station

THERE are about 2,250,000 acres of sassafras soils in the Atlantic Coastal Plain. Wheat, corn, clover and grass are important crops on these soils north of the cotton belt. The sassafras loams, sandy loams, and silt loams of the Delaware and Chesapeake Bay Region and adjacent territory are the principle wheat producing soil types of the sassafras series. These soils are well drained, remarkably retentive of moisture, and easy to plow and keep in good condition. They are yellowish brown to brown in color and of mellow structure underlain by reddish yellow material of a coarser nature.

There are more than 250,000 acres of this soil devoted to the crops mentioned. The average yield of wheat is between 15 and 16 bu. per acre—a yield that is too low for economic production. The farmer doesn't have anything to say about fixing the selling price of wheat but he does have something to say about the cost price. Such items as preparation of the seed bed, variety, seed treatment,

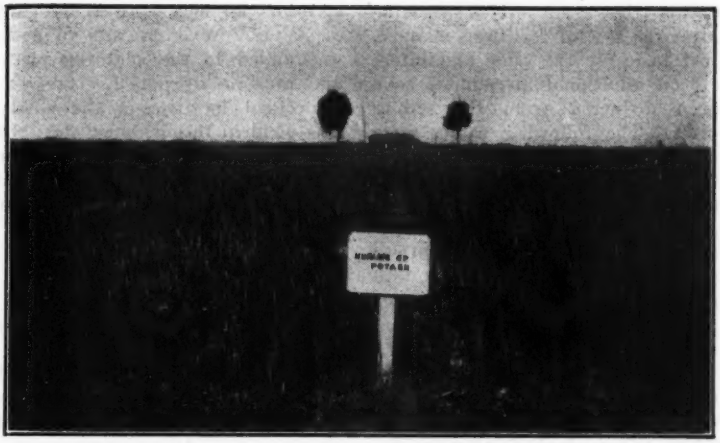


Plate II. Received 120 lbs. muriate of potash. Average annual yield 16.3 bu. per acre for 15 years. Delaware Agricultural Experiment Station

for Sassafras Soils

¶ *Valuable facts based on careful investigation*

and use of fertilizers are all under the farmer's control and influence the cost of production.

The Delaware Experiment Station has 15 years' results with fertilizers on wheat that have been conducted on a Sassafras silt loam soil. A digest of these results are given in table I.

Net returns as used in table I.

Fifteen Years' Results With Fertilizers on Sassafras Silt Loam Soils

Treatment	Ave. annual Yld. bu. per A.	Ave. Test Wt.	Ave. U. S. grade	Ave. annual net returns per A.
No treatment	10.4	51.6	5	$14.38
Nitrate of Soda 125 lbs. per A.	12.7	52.5	5	15.11
Acid Phosphate 250 lbs. per A.	15.8	55.9	4	19.73
Muriate of Potash 120 lbs. per A.	16.3	56.7	2	19.99
N. P. amounts as above	20.5	55.1	4	23.69
N. K	20.5	55.7	4	26.09
P. K	22.7	58.0	2	30.12
N. P. K	28.9	58.8	2	38.08
Manure 5 T	23.0	56.1	3	32.50

means that sum which remains after the cost of fertilizer, manure, cost to apply the same and interest on additional investment have been deducted from the selling price. The following values were used in determining the net returns from the use of fertilizers and manure: Nitrate of soda, $60 per T.; acid phosphate, $16; muriate of potash, $48; manure, $1.85; wheat, $1.25 per bu.; straw, $10 per ton; spreading fertilizers, 35c. per acre and interest on additional investment at 6 per cent.

The untreated plot gave an average yield of 10.4 bu. per acre with net returns amounting to $14.38. Where single fertilizer materials were applied muriate of potash ranked highest in increased yield and net returns. The yield was 16.3 bu. per acre with a gain of $19.99 above the cost of the fertilizer, cost of applying, and interest on additional investment.

Various combinations of two fertilizer materials were also tried and the combination of acid phosphate and muriate of potash gave the greatest returns. The yield was 22.7 bu. per acre with a net gain of $30.12. When nitrate of soda was added to the acid phosphate and muriate of potash there was a decided increase in the yields. The yield in this instance was 28.9 bu. with a net gain of $38.08 per acre. Manure gave a yield of 23 bu. with a net gain of $32.50 per acre.

IT may be said that muriate of potash is the first factor in increasing wheat yields and profit and that where this hunger has been satisfied, acid phosphate and nitrate of soda may be added with the expectation of further increases in yield and profit. This wheat was grown in a rotation of corn, soy beans, wheat and hay (clover and timothy). Wheat is not always grown under such conditions and fertilizer practice must necessarily be guided by the cropping scheme used as well as the soil type. Wheat that follows a heavily fertilized crop of tomatoes

(*Turn to page 53*)

Plate III. Received 120 lbs. muriate of potash and 250 lbs. acid phosphate. Average annual yield 22.7 bu. per acre for 15 years. Delaware Agricultural Experiment Station

These two entered a pig race last year and the youngster won

FRIENDLY RIVALS

By

H. Howard Biggar

THAT ton litter contests in hog production attract folks of all ages is well demonstrated in the case of two contestants in Iowa's contest in 1925. Charles Hughes of Randolph and Leroy Miller of Yorkton, without doubt, represent the age extreme in the United States, Mr. Hughes being 84 years of age and Leroy Miller, 10 years old.

AS a seeming coincidence, it is interesting to note that these two hogmen brought their litters together in a ton litter show held at Shenandoah, Iowa last fall, and the boy won out. His litter weighed 2,040 pounds and the litter shown by Mr. Hughes weighed 2,012 pounds, at the end of the six months' period.

The Hughes' litter represented the cross of a Poland China sow and Spotted Poland China boar. The litter ran in a pasture of blue grass and white clover during the summer. They had a ration of ear corn, skimmilk and shorts, with some tankage. The litter of young Leroy Miller was of the Poland China breed. The litter was allowed the run of the orchard. They received a ration of oil meal, tankage, corn, oats, separated milk and slop.

Mr. Hughes, although past four score years, is a boy in spirit and is a real booster for boys and girls club work. He feels that it means a new era for farming.

The *American Soil Survey Association*

By Dr. M. M. McCool

Professor of Soils, Michigan State College

THE American Soil Survey Association grew out of the conference of a few workers in the middle western states at Chicago during the Fall of 1919. It was organized for the purpose of establishing a closer relationship among soil survey workers, to provide a medium for the free discussion of problems arising in soil survey work and to aid in developing a closer cooperating relationship between the several states and the United States Bureau of Soils. To state it more briefly, the purpose of this organization is to bring about improvement in soil survey methods in America.

THE first get-together, an informal one, was held in a hotel in Chicago. Those present were Messrs. Condra, Marbut, Miller, McCool, Sauer, Whitson and Wiancko. The discussion for the most part consisted of the advisability of greater attention being paid to the correlation of soil types and the improvement in maps and reports of soil surveys. It has functioned from the beginning and each year the meetings are hot, and it is doubtful if the results obtained have been excelled or equalled over a given length of time by any similar organization in this country.

At the first meeting it was considered advisable to form an organization, temporary officers were appointed and one year later the first formal program, which was organized by President A. R. Whitson, was held at the University of Chicago. The success of the meeting exceeded the fondest hopes of those who were present at the first meeting. The attendance was reported to be 63 workers.

THE following year the meeting was held at the Michigan State College, East Lansing, Michigan, with M. F. Miller presiding, and again the outcome was gratifying. The secretary reported a membership of 136, distributed among 34 states, 8 Canadian provinces and the Philippine Islands. The third annual meeting was held at the University of Illinois, Professor A. T. Wiancko presiding. The attendance of 51 enjoyed one of the best programs of the Association. The fourth meeting was held in Chicago, under the presidency of Dr. F. J. Alway with a record attendance. The fifth was also held in Chicago, the writer presiding, and the sixth and last meeting likewise was held in Chicago, the president being Dr. G. W. Conrey.

Many nations were represented at the International Soils Congress held at Rome, Italy, in May, 1924. The next meeting is to be held in the U. S. A. in 1927. These meetings are doing much to advance Soil Science

One of the great accomplishments of the American Soil Survey Association has been the stimulation of the soil survey field workers. As a result of contact with the various others who are engaged in soils investigations and exchange of ideas, these men realize as perhaps never before, that they have a real job, and that the success of the soil survey program of America depends in no small measure upon them, that is, their attitude with respect to keeping up-to-date and also with respect to the quality of the work they do in the field. If the soil survey was ever a place for an unscientific, unprogressive, self-satisfied individual, such is no longer the case, and it is probable that the field workers realize that they owe it to the good of the cause to either advance with the modern conception of soil survey methods or to withdraw from the service.

The Soil Survey Association has done much to bring about changes in the system of soil classification. It is probable that such changes as have taken place within the last six years would not have come about short of a quarter of a century without an organization of this sort. It must be recognized that the success that has been attained is due in no small measure to the personality, broadmindedness, knowledge and experience of Dr. C. F. Marbut.

AT the present time the soil survey is on a more scientific basis than it has ever been in its history. The workers in this country as well as in foreign countries realize that any soil classification that will meet what may be called world wide demands, must be fundamentally scientific. Quoting Dr. Marbut: "By this statement is meant that the classification must be based on the studies of the soil made for the single purpose of finding out the truth of its character, but no reference whatever to other considerations." In other words if we are to progress in this field, soils must be considered as any other natural body. They must be approached

directly and studied as soils—soil characteristics must be studied and described.

The men engaged in soils work, who have attended the meetings of the Association are speaking of soil profiles and describing soil types by the horizons that make up the profiles. This is new—only a few years ago we did not follow such methods, but spoke only of "soils" and "subsoils." It is no longer considered to be good form to employ the term "subsoil," in the Association meetings. In sampling soil types for studying their various characteristics, the samples are no longer taken to arbitrary depths and separated and studied in the laboratory as surface and subsoils, but the horizons are sampled as they occur in the field and studied as such. It has been shown that they may, and usually do, vary greatly in their physical and chemical characteristics. The plant roots may come into contact with materials of vast differences, which are not brought out when the horizons are sampled and thrown together and studied. A few illustrations set forth by Marbut, some of which are quoted verbatim, may be cited to show the principles of the modern system followed in describing and classifying soils.

PROFILES and mature soils throughout the world, so far as our knowledge at present will permit us to generalize, consist of two main horizons: (1) Upper horizon, in which the material has been removed as compared with the lower horizon, a horizon, therefore, of extraction, and (2) Lower horizon, to which material has been added, a horizon of concentration. There are two main soil groups in the world, distinguished one from the other by the prevailing character of the material accumulated in the concentrated horizon.

In group 1, fine grained material has been transferred from the surface portion of this soil downward, accumulating in a lower horizon. In addition there has been a removal of oxides, alkalis, alkaline earths, organic matter, iron and alumina. It should be stated also that none of the mature soils in this group contain carbonates in any of the horizons. The horizon of extraction is usually called the A horizon and the horizon of concentration is called the B horizon, while the material below in which there has been no noticeable removal or accumulation is called the C horizon. It is the original geological material.

In cases of the soils of group 2, there may not have taken place a mechanical transfer of fine grained material from the upper part of the soil and its accumulation in the lower, but in the mature or fully developed soil, usually lime carbonate has accumulated in some horizon which is called the B horizon. The latter group of soil has been developed under arid or semi-arid conditions.

Naturally each of these two main groups of soil may be divided into sub-groups. It is impracticable for these to be discussed in this article, but it is well to note that there are now recognized five distinct sub-groups in group 1, differing in the kind of material accumulated in the B horizon and also in the extent to which the oxides, etc., have been removed from the soil profile. Although the sub-groups of group 2 are somewhat less well defined, yet eight of them may be identified in the field.

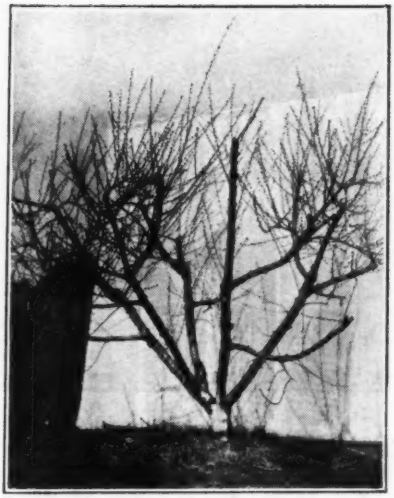
The northern or podsolized forested soils offer a striking example

(*Turn to page 59*)

New "Prunes" *for* Peaches

By
E. C. Auchter

Head, Dept. of Horticulture,
University of Maryland



A tree pruned moderately produces many shoots with numerous fruit buds

A FEW years ago nitrogenous fertilizers were never recommended for peach trees. It was felt that such trees would make too dense a growth, that the fruit would not color well, and that the buds and wood would not harden sufficiently to withstand cold winters. Damage from peach tree borers was very severe. Often as much damage was done to the trees by the person who was trying to cut out the borers as was done by the borers themselves. It was seldom that all of the borers were ever removed each year by the old wire and knife method.

At the same time many growers tried year after year to grow crimson clover cover crops on land which was not suitable for getting a satisfactory growth of this crop. Many orchards had been planted on the shale and soapstone soils throughout the Alleghany mountain regions. This soil was not a very fertile one. As a result of the poor soil root injury from borers, meager cover crops, and lack of nitrogen fertilization, it became necessary to prune the trees rather hard if enough new growth was to be developed to produce a crop of peaches.

Peach trees bear their fruit on the wood of the previous season's growth. When trees are headed back, a vigorous growth of new shoots generally takes place immediately below the points where the cuts are made. In order to have enough water and plant food available to cause sufficient growth of the buds left, it was necessary then to prune fairly heavy. This pruning, of course, reduced the number of buds and each of the

(*Turn to page 52*)

Long, tedious hours preparing for winter

Unbending Backs

By V. T. Bartle

University of Wisconsin

ONLY those who have worked, with wearying backs, at the bucksaw or pulled long hours on an old "crosscut" can fully appreciate the released and relieved feelings which followed the introduction of the power saw. Only those who have spent long hours of some of their boyhood days, smelling and watching the sawdust flung backward and forward, can really vision the backaches and tired feelings now saved, as the rugged teeth of the circular saw penetrate log after log and grow in a single day, a season's woodpile.

THE time was—and not so long ago—when farm boys and woodpiles just naturally went together. A familiar call, on frosty mornings, was that of the pioneer father, rousing his yawning sons from their "feather beds" to saw, split, and lug fuel for the greedy kitchen and sitting-room fires. Then, too, there were after-school sessions; and even holidays were not free from woodpile duties.

To father, Saturday seemed an ideal day for working the crosscut saw. With no school duties to intervene, the farm youth was free to go to the log pile and take a man's place at one end of the saw. Those were times when boys knew the true meaning of backache,—times when even the strongest sons were tempted to "ride the saw."

Is it any wonder, then, that

A season's woodpile in a single day

in FARMING

¶ No. 3 of this interesting series of "progress" stories

sometimes the farm boys, too well acquainted with the woodpile dreamed of what so many have thought were city advantages? The job of sawing, taken in moderation and with well sharpened and set saws, might have induced fond memories. Instead, long winters of drudgery at the woodpile undoubtedly induced many a youth to adapt himself to what he then thought were less tiring tasks in the neighboring city.

BUT fortunately for the farm youth, other farm boys dreamed too—dreamed of easier ways to "pyramid" the winter's woodpile. These dreams came true in the perfection of the circular saw and the drag saw, and, a bit later, in the application of the gas engine to the task of sawing.

Always revelling in "seeing the wheels go around," the farm boy is enjoying, today, the busy hum of the circular saw. The spinning of the saw, the magic of machinery harnessed to work, and the fragrance of the freshly-cut wood are as alluring to the machine-loving youth as is the flaming iron art of the village blacksmith. With this prospect in mind, he gladly aids in gathering "windfalls," old rails, and all available wood about the farm for an opportunity to watch and, eventually, to help operate the saw.

With the supply of wood gathered to be sawed, the farmer and his helpers may be seen transporting the sawing rig to the scene, and beginning an afternoon's, instead of a winter's job. One after another the logs are pressed

(*Turn to page* 46)

A field of cane which will "profit" little

SUGAR CANE

By The Editor

¶ *As a result of a recent visit to Louisiana*

SUGAR used to be a luxury for the rich. It is now a necessity for everyone. The production of sugar within the United States is, therefore, a matter of interest to all.

Unfortunately, however, many sugar cane plantations do not give the yields they did years ago. Eastern Louisiana — famous as the "heart" of the Sugar Cane Belt of the United States produces large tonnages of cane sugar. Nevertheless, some growers are concerned with conditions that make the profitable production of cane in many fields a difficult matter. In some cases fields have been abandoned and others have corn planted in the gaps where the cane died out or failed to come on.

To help the sugar growers of the State, Dr. R. C. Tims, Assistant Plant Pathologist of the State Experiment Station at Baton Rouge, and others, have been conducting research work for some years. Dr. Tims has been working on the diseases of sugar cane and valuable results have been contributed to the sugar industry. Knowing the similarities between corn and sugar cane, and that Dr. G. N. Hoffer, plant nutrition specialist of Purdue Agricultural Experiment Station and the United States Department of Agriculture, had conducted research work on the dis-

eases of corn, especially root rots, Dr. Tims invited Dr. Hoffer to take a preliminary trip through the sugar cane fields of eastern Louisiana. He wanted particularly to see if there was any similarity in the mal-nutrition symptoms of the two crops.

With this end in view, the party spent a day in eastern Louisiana inspecting sugar plantations. Tests similar to those made on corn stalks were applied to the cane plants. It might be noted that one part of the test on corn stalks is to examine the tissues at the nodes or joints of the stalk to determine if iron has concentrated in the nodes. The relative quantity of iron is found by using a solution of potassium thiocyanate on the fresh tissues at the nodes when the stalk is split open. The intensive red color indicates the relative concentration of iron. Research work has shown that undue concentrations are associated with a deficiency of potash. A test is also made to determine the amount of nitrogen. By studying the soil reaction and the growth of the plants the relative requirements for phosphates can also be found.

Applying these tests, which have been developed for corn, to the sugar cane it was found that nitrogen was usually present in sufficient quantities, but that the cane in many fields in the vicinity of the Reserve area carried abundant quantities of iron.

The interesting point is that if these tests on sugar cane are properly comparable to those made on corn, potassium deficiencies are indicated. While, of course, this is an indication only, it shows a possible field for further research to determine if such correlations are based on the sound scientific facts.

In addition, the soil in the root rot areas tested was markedly acid. Many of the cane plants were small and not very thrifty. This would indicate that phosphates were needed, as well as potassium.

It has been found in the Corn Belt that the continuous cropping of fields with corn and legumes and the removal of a large part of the crops from the lands have depleted the soil available potassium. Again, if these conditions are comparable with fields continuously grown with cane, it would seem to indicate the possibility that many cane fields represent unbalanced fertility conditions. This possible correlation opens up a field of scientific investigation that may prove very profitable to the sugar cane growers, while at the same time appreciating the importance of breeding resistant and high-yielding strains of cane, and studying all other factors in connection with sugar production.

The long history of the work of the Louisiana State Experiment Station on problems of sugar cane production would guarantee that the status of this problem will be thoroughly and practically worked out.

The way the cane should look

Ready for the most exacting epicures

A *New Raspberry*

By L. S. Richardson

United States Department of Agriculture

TRUCK farmers and home gardeners in certain sections of the Southeast have never included the raspberry in their garden menu for the simple reason that no variety grown in the United States was adapted to that territory. They can now add this most desirable fruit to their list of garden products, however, for the United States Department of Agriculture has come to their aid and perfected a variety especially adapted to much of the area where raspberries are not commonly grown.

The new variety is the long-talked-of Van Fleet raspberry. According to an announcement from the department, plants for starting purposes are available to growers this winter for the first time. They can be purchased from several southern nurseries, cooperating with the department in propagating the new variety, the names of which will be furnished by the department upon request.

The Van Fleet is adapted to the territory extending from New York and southern Michigan southward to central Florida and Louisiana. It is especially desirable, however, in Maryland, Virginia, North and South Carolina, Georgia, and Florida, where no other variety is adapted.

(*Turn to page 54*)

¶ *No. 5 of Professor White's series*

Kentucky Blue Grass

By J. W. White

Soil Research Chemist, Pennsylvania State College

THE value of several, differently treated, pasture areas may be estimated in two ways: First, by feeding an equal number of grazing animals and determining the value of the products produced for a definite period; and, second, by determining the total weight of grasses produced on each area and computing the known feeding value in terms of digestible nutrients required for maintenance and production of animal products such as milk, beef, pork or mutton, and wool.

The first method is open to objection because of the variability of animals even of the same breed where a comparatively large number have to be included in each feeding lot. The increased number of animals also requires larger feeding areas, which introduce a serious error of soil variability. The second method has the advantage because smaller areas may be used, such as long, narrow plots which are known to reduce the error of soil variation.

The second method is used in this publication, although it involves more or less theoretical consideration. The yields of blue grass as determined are computed in terms of fresh green Kentucky blue grass available for grazing animals for a period of five months. The yield of grass for the second cutting is taken at 40 per cent of that produced at the first harvest, instead of 54 per cent as actually found, to allow for the grass destroyed under grazing conditions. The Cornell studies, cited earlier, show that when Kentucky blue grass is frequently cut it yields 13 per cent more than when cut less frequently, as in the case of a meadow. We may, therefore, assume that the yields of grass shown in preceding tables would be available for grazing animals.

The feeding value and carrying capacity are estimated in terms of dairy cattle producing different quantities of milk. Eighty pounds of green grass per head each day are used as the basis of computation. This figure represents the maximum amount of grass that would likely be consumed per day, and this quantity contains sufficient digestible crude protein (2.96 lbs.) to meet the demands for maintenance and milk production of an average 1,200-lb. dairy cow producing from 35 to 40 lbs.

(*Turn to page 50*)

Getting Educated *on* Quack Grass

By M. A. Crosby

United States Department of Agriculture

EDITOR'S NOTE:—*This completes Mr. Crosby's story of the boy who whipped quack grass and incidentally earned a university education.*

"I don't need to think it over, Dad," said Billy, "I've been doing that ever since I mentioned my plan to you. I am all ready to tackle the quackgrass, and believe I will feel better earning my college money that way than to have you give it to me outright."

"All right son, hop to it! We're pretty well caught up on the work right now so you can start in right away."

The end of July saw Billy well started on his campaign on the 20 acres of quack infested pastureland. For the plowing an old "prairie breaker" had been rigged up with a rolling coulter and newly sharpened shear. This type of plow was used so that the long, thin furrow slice would be turned over flat thus bringing all the rootstocks to the surface. The land was broken to a depth of only about three inches, just deep enough to get under the lowest living rootstocks. More than usual care was taken with the plowing so as to insure every particle of sod being turned over and no "cut and cover" spots left. Due to the hot weather, and the care with which the work was done, some two weeks were consumed in breaking the 20 acres.

Following the breaking of the land came two weeks of hot, dry weather during which the thin furrow slice and its mass of quackgrass rootstocks were well dried out. Ten days after the plowing was finished the ground was gone over with a springtooth harrow. This ripped the sod to pieces and brought most of the dried out rootstocks to the surface. These were then raked up with a hay rake and burned. The harrowing was repeated every 10 days or so up to the middle of October, each successive harrowing bringing to the surface a few more rootstocks.

So thorough was Billy with his fall treatment of the land that only a compartively few quackgrass plants survived. As soon as these showed up in the spring the ground was thoroughly harrowed and such live rootstocks as were brought to

the surface were carted off and destroyed. Several harrowings followed through May and early June, and the last week in June the land was sown to buckwheat.

The intensive and thorough tillage which the land had received made an ideal seedbed, and the buckwheat came up in a few days and grew amazingly. The lush growth soon completely shaded the ground, and when the plants arrived at full bloom the field closely resembled a vast bank of fluffy snow. Countless myriads of honey bees labored all day long gathering nectar from the snowy blossoms, and filled the air with the droning hum of their busy wings.

As harvest time approached Billy's buckwheat field became the talk of the neighborhood. No one had ever seen so promising a crop, and yields ranging all the way from 35 to 75 bushels to the acre were predicted. One day a buyer for a large seed firm heard of this famous crop and drove out to see it. After a careful inspection of the field he pronounced it the best and cleanest he had ever seen, and offered Billy $1.75 a bushel for the whole crop. As this was 15 cents above the market price at that time his offer was accepted on the spot.

Harvest time arrived and soon the crop was cut and shocked. A week of warm fair weather and the buckwheat was dried out and ready for the thrasher. Then came a change in the weather that brought anxious days for Billy. Rain threatened daily and the thrashing outfit was several farms away. But Providence was kind, the rain held off, and at last the trashing outfit pulled into the field. Soon the huge separator was hungrily devouring a seemingly endless stream of bundles, while another endless stream of brownish-gray grain flowed into the wagons waiting to convey it to the granary. When the last load had been dumped into the bins and the measurements checked up it was found that Billy had over 800 bushels of marketable grain, besides a reserve supply for "flapjacks" and seed for the following year. A week later the 800 bushels had been delivered to the buyer and Billy had $1,400 to his credit in the local bank.

"Well son," said old Bill, as Billy proudly exhibited his bank book, "that looks like you have a pretty good start toward your college expenses. If your alfalfa stunt comes through all right you will have earned the right to the best brand of education our agricultural college can dish up for you."

The tangled roots of quack grass

At odd times during the summer Billy had hauled out

some 60 tons of ground limestone for use on the land in preparation for his alfalfa venture. As soon as his buckwheat had been harvested this ground limestone was spread on the field and the land plowed. The following spring the land was harrowed until a fine seed bed was procured. Only a few shoots of quackgrass showed up and these were pulled up and destroyed. Western grown alfalfa from a non-irrigated section was purchased through the Farm Bureau. Experiments had proven that seed from this source was best for the locality. Nodule-forming bacteria culture was secured from the Agricultural College and the seed thoroughly and carefully treated, extreme care being taken to follow instructions to the letter. The seed was sown both ways of the field to insure an even stand, 10 pounds to the acre being used at each sowing.

FOLLOWING the seeding came warm, balmy weather with an occasional shower, and in a few days the young alfalfa plants began to push up through the mellow earth. Soon the field was covered with a thick stand of thrifty, vigorous plants. As time passed the dark green color of the young alfalfa plants was proof that the inoculation had been effective, and gave promise that unless some unforseen calamity intervened Billy's alfalfa venture was going to be a success.

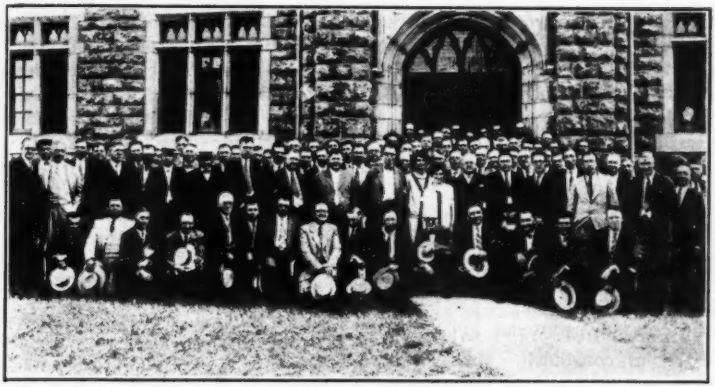
A few scattering weeds appeared in the field, and an occasional shoot of quackgrass struggled to push itself above the rapidly growing alfalfa. But Billy had no fear that these interlopers would materially injure his thick stand of alfalfa. The first mowing would check the weeds and grass while the alfalfa would come on with still greater vigor.

Two cuttings of alfalfa were made the first year. The first was made the last week in June and yielded 15 tons on the 20 acres, and the second cutting, coming in August, produced 30 tons, making a total of 45 tons for the first year's production.

For his 45 tons of alfalfa Billy received from his father $15 a ton, or a total of $675. This sum, added

(*Turn to page 54*)

The second cutting of Billy's alfalfa yielded one and one-half tons to the acre



The fertilizer salesmen who attended the short course

Virginia's Fertilizer School

By T. K. Wolfe

Agronomist, Virginia Agricultural Experiment Station

THE first Fertilizer School held for fertilizer salesmen by the School of Agriculture of the Virginia Polytechnic Institute convened at Blacksburg, Virginia on June 29 last. There were 150 people in attendance including 125 representatives of some 12 fertilizer manufacturers and distributors.

The object of the school was to acquaint the dealers in fertilizers with the latest results obtained through experimentation as to the use of fertilizers on Virginia's soils and crops. The hearty cooperation of the Southern Division of the Soil Improvement Committee of the National Fertilizer Association made the school possible. Certainly the school has made for a closer and more secure cooperation between the agricultural college and the fertilizer industry.

The unusual feature of the meeting was that no speaker was allowed to consume more than his allotted time. The success of the meeting is well shown by the statement made by a man prominent in the fertilizer industry. He said: "I have never seen so large a group of business men sitting without restiveness through two such long sessions. It speaks mighty well for the agronomists who addressed them."

The day was a busy one and the marked success was due largely to

W. F. Pate, Agronomist of the National Fertilizer Association, who made the arrangements for the school and Professor T. B. Hutcheson, Agronomist, of the Virginia Polytechnic Institute, Chairman, who steered the meeting in a masterly manner.

The address of welcome was delivered by Dean H. L. Price, of the School of Agriculture, who called attention to the close interdependence of agriculture and the fertilizer industry and to the necessity of considering the agricultural as well as the commercial value of fertilizers.

Honorable George W. Koiner, Commissioner of Agriculture of Virginia, in his address on the Agriculture of Virginia, touched upon the many natural advantages existing in the State from the standpoint of farming. He stressed the value of rotations and fertilizers for the upbuilding of Virginia soils. Recent changes in the Virginia laws relative to fertilizers were touched upon. The chief items of interest being the law requiring the naming of the source of material and the special labelling required when sulphate of potash was used as a source of potash.

Dr. A. W. Drinkard, Jr., Director, Virginia Agricultural Experiment Station, who followed Mr. Koiner, discussed the fertilizer work of the station. The station is now conducting some 3,000 fertilizer plats and since its inception much attention has been given to the study of fertilizer problems.

Prof. T. C. Johnson, Director, Virginia Truck Experiment Station, discussed the use of fertilizers in relation to the supply of organic matter for truck crops. He also pointed out that soil acidity in some instances has an important influence on the results of fertilizers. Throughout the entire address of Prof. Johnson attention was called to the value of organic matter in the sandy soils of the trucking region. He stated, "Our conclusion is that commercial fertilizer as a panacea in the trucking section is not sufficient but with organic matter added, an entirely different result is obtained."

Mr. C. J. Brand, Executive Secretary and Treasurer, National Fertilizer Association, gave a comprehensive and thought-provoking address on the Fertilizer Industry and the Farmer. He showed the close relationship between the value of agricultural products and the sale of fertilizers. He stated that when the purchasing power of the dollar dropped to 69 cents from 92 cents, the tonnage of fertilizer fell from 7,665,000 to 4,498,000. Mr. Brand forcibly indicated the value of fertilizers in increasing our food supply to feed our increasing population which by 2100 will be between 185,000,000 and 200,000,000, it is calculated. The speakers stated that fertilizer offers the farmer one of the best avenues for meeting present-day problems. The farmer, according to Mr. Brand, can better afford to buy fertilizers than any other major element in farm costs. "Commodities are 62 per cent above par, farms 47 per cent, interest on farm indebtedness 154 per cent, taxes 212 per cent, farm implements 135 per cent, fertilizers 125 per cent, and all farm costs 169 per cent. In other words, fertilizer expenses in terms of the commodities are the cheapest things the farmers can buy."

Professor T. B. Hutcheson, head of the Agronomy Department, Virginia Polytechnic Institute, followed Mr. Brand and spoke on Fertilizers for Tobacco. Professor Hutcheson is recognized as one of

the leading agronomists of the South and no one in Virginia knows more about the use of fertilizers on tobacco than he. He called attention to the fact that all types of tobacco require a fertilizer analyzing 8 per cent phosphoric acid, 3 per cent ammonia and 3 per cent potash. However, the formula varies, especially in reference to the source of ammonia. He discussed the comparative value of muriate and sulphate of potash for tobacco and recommended the use of one-half of the potash from muriate of potash and one-half from either sulphate of potash or sulphate of potash-magnesia.

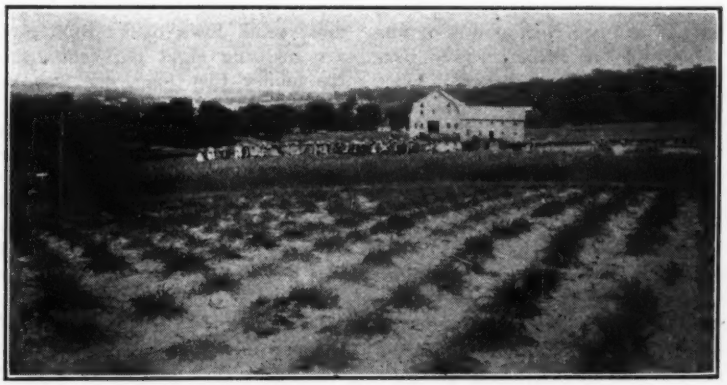
Director John R. Hutcheson, of the Virginia Agricultural Extension Service, was the first speaker of the afternoon. He discussed the relationship of extension work to the farmer and the fertilizer dealer and outlined the aims of the extension service. He concluded as follows:

"Our program is just the program of any other business. Our purpose is three-fold; (1) Help the farmers put a safe foundation under farming by living at home. And I do not know of any who can help this more than the fertilizer people. (2) Lower the cost of production of what they produce. In Charlotte county, Virginia, a survey showed that it costs from 11 to 49 cents per pound to produce tobacco. (3) Teach the farmers better methods of distribution."

At the special request of some of the salesmen Professor F. A. Motz, Extension Horticulturist, spoke on Fertilizers for Apple Orchards. The speaker very clearly and concisely outlined the indications of the need of fertilizers for apple orchards. Professor Motz stated that ordinarily a fertilizer made up of two parts of acid phosphate and one part of nitrate of soda should be used for fertilizing apples. Trees 12 to 25 years of age will require from 2½ to 5 up to as much as 10 pounds of the mixture. Trees up to 6 years of age will require from ½ pound to about 1 pound. For young trees, for the first few years after setting out, nitrate of soda was advised regardless of the richness of the soil.

A paper of much merit was presented by Dr. W. B. Ellett, Chemist, Virginia Agricultural Experiment Station, showing the proper

(*Turn to page* 60)



The Soil and Crop department answering questions

Coming *through the* Alfalfa

By I. J. Mathews

Winamac, Indiana

EDITOR'S NOTE:—*Mr. Mathews finishes telling his experiences with a worn-out farm. He started this story last month.*

I am looking out the window now on a piece of new alfalfa that was seeded in barley last spring. This emphasizes the fertilizer needs of such run down soils most forcibly. This particular 12 acres was in rye in 1923. In the spring of 1924, we plowed the ground, then immediately sowed the ground limestone, and planted corn. With this corn, we used 150 pounds to the acre of a half and half home-mixed muriate of potash and 44 per cent phosphate. Although 1924 was a poor corn year around here, we had as good corn as any of our neighbors. In 1925, I sowed barley on this field, we disked it twice and then I sowed two bushels of a mixture, one half of which was Utah common alfalfa and the other was Ontario variegated alfalfa. When the barley got about six weeks old, I noticed narrow strips through the field that seemed a little greener and more vigorous than the wider strips between. These became more and more pronounced and investigation showed that these green bands were the corn rows in which we had sown the fertilizer the previous year.

I could give more interesting details but many of them would merely give point to the general statement that the best treatment for an asthmatic farm is to stimulate its life processes with limestone, then feed it up with the proper fertilizers, and get the vagrant acres to working.

"BORROWED money at 8 per cent." I'm sure that got a raise out of my readers especially those fortunate enough to be able to borrow money at less. Eight per cent looks high and it is high. But if I may be permitted this frankness, most small town banks right now are realizing eight per cent from the money they loan, one way or another.

Be that as it may, the choice on this place was between eight per cent and a failure, between basic improvement or moving. We had accumulated a lot of trash in our 15 years of married life and it was less expensive to use eight per cent money than to move.

Of course, I heartily approve of cheaper money, but I must state that in my case, and in the case of

(*Turn to page* 56)

Smith-Hughes students doing spraying work under the supervision of one of the state horticultural inspectors. The spray outfit was assembled in the farm shop

Farmers *of the* Future

By Mark Havenhill

Instructor in Farm Mechanics, Woodland High School, California

DURING the early days of one of the greatest civil wars that the world had ever known, the nation recognized the fact that there must be more economic and scientific practises in agriculture if this great country of ours was to prosper. On July 2nd, 1862, President Lincoln signed a bill which became known as the Morrill Act, whereby each state could establish a college of agriculture and mechanic arts, and receive federal aid in maintaining it.

You are all familiar with these institutions and what they are doing, but do you know that less than one out of every 100 students go to college and probably not more than one out of every three of these studies agriculture? Therefore, it may be seen that after 63 years these institutions are not making a very deep scratch on the education of the masses.

During the early stages of another great war 55 years later, the attention of the great minds was again drawn to this educational problem. On February 23, 1917, another president, Woodrow Wilson, signed a bill known as the Smith-Hughes bill which again allows the states to establish another great educational system and again receive federal aid in maintaining it. This bill provides for the promotion of education in agriculture, the trades, and industries, in the secondary, or high schools. The trades and industries spoken of in this bill correspond to a very marked degree to the mechanic arts of the Morrill Act.

(*Turn to page 55*)

UTAH

By P. V. Cardon

Farm Economist, Utah Agricultural College

¶ Quite a jump to the Beehive State, but we're here—let's enjoy Professor Cardon's hospitality

EXACTLY one year and six days after Congress on March 2, 1887, authorized the establishment of agricultural experiment stations in the United States, the Utah Territorial Legislature passed the bill sponsored by Hon. Athon H. Lund, which created the Utah Agricultural Experiment Station. That was on March 8, 1888. Two years later, this station was fully organized and functioning, at Logan, Utah, under the direction of Dr. J. W. Sanborn, who served also as the first president of the Utah Agricultural College.

Dr. Sanborn came to Utah from the University of Missouri for the express purpose of organizing the newly created experiment station. He remained in Utah four years, during which time he laid the foundation upon which his successors in turn have built one of the most successful experimental organizations in western America. Dr. Sanborn is now living in his native State at Pittsfield, N. H., on the farm founded by his ancestors nearly 300 years ago.

Dr. Sanborn was succeeded as President and Director by Dr. J. H. Paul, who served in this capacity from 1894 to 1896. Dr. Paul is now professor of Natural Science at the University of Utah. His successor as Director of the Utah Station was Luther Foster, who served until 1900 and then moved to New Mexico.

Director Foster was the first to hold the position of director after it had been divorced from the office of the president of the college. By 1896, the year he was appointed director, it had become apparent that the dual position of president and director was too much of a load for one man, so the board of trustees created two separate positions.

Succeeding Director Foster in 1900 came Dr. John A. Widtsoe, who later gained an international reputation as an authority on both irrigation agriculture and dry farming. He served as director until 1905, when he left the institution for two years and returned in 1907 as president of the Utah Agricultural College. Still later he was made president of the University of Utah, and is now prominently identified with the Church

(*Turn to page* 47)

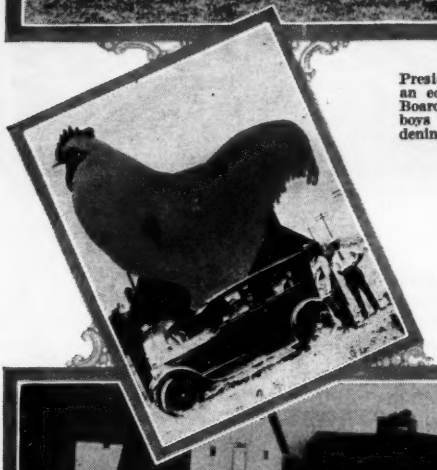
Better Crops' ART GALLERY *of the month*

Airplane view of the Utah Agricultural College and Experiment Station, Logan, Utah.

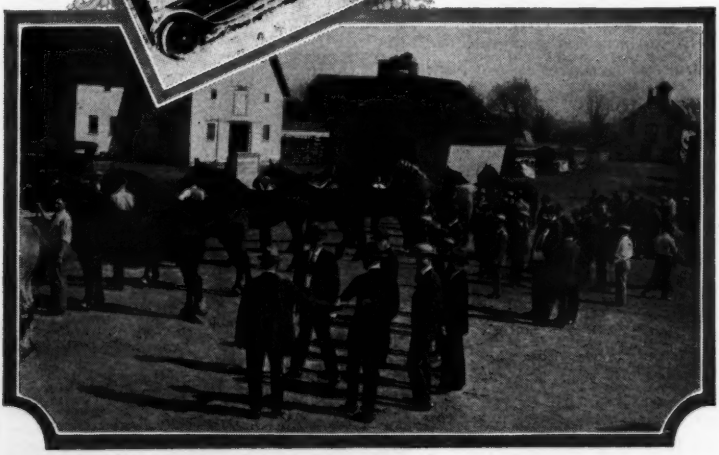
Besides the farms and barns shown in the background, the Utah Experiment Station has near-by farms on which investigations are being conducted with field crops, soils, sheep, dairy cattle, and hogs. In outlying parts of the state, also, there are several dry farm sub-stations, alfalfa-seed farms, and truck farming stations.

The administration building of the Utah Agricultural College and Experiment Station.

President Coolidge with the winners of an educational trip given by the Indiana Board of Agriculture. These are the boys and girls who won prizes for gardening and other farm projects in Hoosier Club work last year.



Something new in farm advertising. This sign, 24 ft. high advertises a large southern California poultry farm.



The agricultural committee, Chicago Association of Commerce, inspecting some of the brood mares at the Purdue University Farm.

Harold P. Sheldon, newly appointed Chief United States Game Warden. He was former Fish and Game Commissioner of Vermont, and is the author of many articles and stories on fishing, hunting and wild life conservation.

Dean J. H. Skinner of the School of Agriculture, Purdue University, enjoying a vacation in keeping with his calling.

A peacetime fleet of baby "caterpillars" making play of cultivating the world's greatest vineyard at Guasti, California.

A Page of

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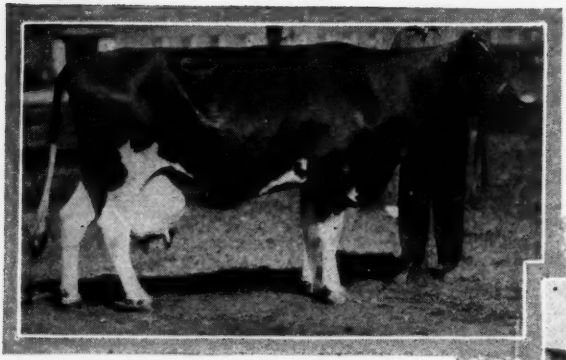
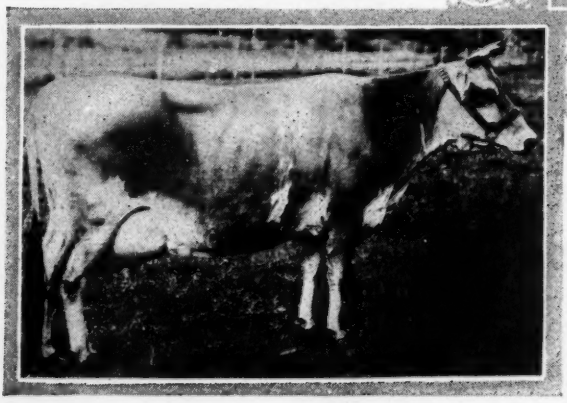


BREED STARS REPRESENT FIVE STATES.

No section and no state has a monopoly on the production of breed champions. The honors of the five great dairy breeds have gone to widely distributed areas. Pennsylvania claims, by adoption, the Ayrshire champion, the Brown Swiss leader is a member of an Iowa herd, an Oregonian developed the Jersey record holder, the Guernsey officials found their title claimant in a Connecticut state and Minnesota is defending its claims to the production of the champion of the Holstein Friesian contingent. The latter, May Walker Ollie Homestead, 300043, was bred by Joseph Hackney, a north star state Holstein promoter. The sire of this noted cow was Piebe Laura Ollie Homestead King, 110474, her dam, May Walker of Arden, 186994. With a record of 1,218.59 pounds of butter fat or 1,523.23 pounds of butter in 365 days, she is acclaimed the champion butter producer in the United States. She was developed by the Minnesota Holstein Company at Austin, Minnesota.



OSBORNE OWNS BRO

A five-year-old is the champ
breed. Her name is June's
yearly test she produced 2
1062.30 pounds of fat.
March, 1926, exceeds the
previous champion, by nearly
Girl is owned by Dr. C.
Thus the championship
has passed from Illinois, to
the famous triple play of
nine—from Tinker

JERSEY CHAMPION IS A WESTERNER

An Oregonian is the champion of the Jersey breed. Credited with the production, in a year, of 16,425 pounds of milk and 1,141.28 pounds of butterfat, Darling's Jolly Lassie has been accorded that high honor by the officials of the American Jersey Cattle Club. Some of the rather unusual things about this splendid record are the fact that its holder was but four years and twelve days of age when she began her record, that she was milked but three times a day during her entire record-making period, and that she carried a living calf seven of the months. She was bred and tested by Pickard Brothers of Marion, Oregon. And her name, when given in full is Darling's Jolly Lassie 435948. Except when used in the company of Jerseymen de luxe her name without her number, is ample.

Champions

" of the Dairy
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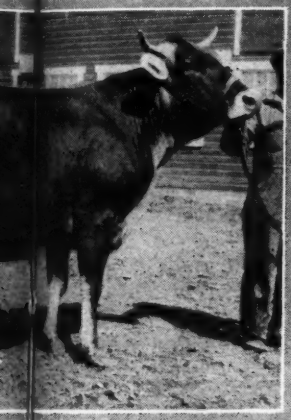
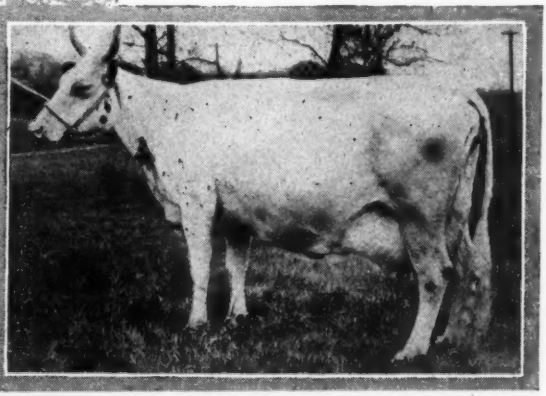


GUERNSEY CHAMPION A NATIVE OF CONNECTICUT.

As the world's champion Guernsey completed her world's record, visitors to the last National Dairy Show watched by means of a telegraphic score board, her progress. Some at the ringside even admitted that a cow race was quite as thrilling as a horse race.

On October 14, 1925, Anesthesia Faith of Hillstead completed a record that gave her premier position among all cows in the Guernsey breed. —19,741.9 pounds of milk containing 1112.5 pounds of butterfat.

The champion is owned by Mrs. John Wallace Riddle, of Farmington, Connecticut. This cow and 75 other females in the Hillstead herd are to be "at home" soon in the dairy barns of the Avon School for boys. This establishment will consist of old English buildings built of native stone and located in the middle of a 3,000-acre tract.



BROWN SWISS CHAMPION.

champion cow of the Brown Swiss
ne's College Girl. 11427. In the
d 2071.6 pounds of milk and
The record, completed during
he fat production of Believe, the
nearly 60 pounds; June's College
. Fairborne, of Hampton, Iowa.
herds of the Yodellers breed
to Minnesota, to Iowa much like
of the noted Chicago baseball
kers Evers to Chance.

AYSHIRE CHAMPION HAD FAMILY OF FOURTEEN

While Lily of Willowmoor holds the Ayrshire record in butterfat production, full championship honors of the breed have been given to Garclough May Mischief. As the Ayrshiremen base their ratings for premier honors on a point system, depending on both milk and butterfat production, May Mischief takes the lead. She was bred by A. M. Baird, Garclough, New Cunnock, Scotland. Percival Roberts, Jr., imported her for his herd at Narberth, Pennsylvania. She has a record of 25,329 pounds of milk containing 895 pounds of butterfat. She was born in February, 1906, and died in 1924 when within two months of being nineteen years of age. Ten of her fourteen calves were born in this country. The others were "Straight Scotch". The champion has six daughters with thirteen records that average 12,039 pounds of milk and 471 pounds of butterfat. She also has two advanced registry sons.

Five generations of purebred Belgian mares that are owned by the North Dakota Agricultural College, Fargo, North Dakota. Laura de Langemarck, to the extreme right is the dam, grand-dam, great and great, great grand-dam of this quartette. She was imported from Belgium.

Near the source of one of the world's greatest "drainage" systems—the Mississippi River. With its tributaries this great stream, whose modest beginning is pictured here, drains an area of approximately 1,250,000 miles. Its source is in northern Minnesota.

The Editors Talk

We live forward, but we understand backwards.—Danish Thinker.

THE question of using more concentrated fertilizers is a practical one. It is often discussed. Do you consider it a good idea or not?

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CONCENTRATED FERTILIZERS

The arguments advanced in favor of concentrated materials are briefly; lower costs of handling and transportation and to insure a supply of fertilizer materials in the event that the supply of low grade materials, such as cottonseed meal proves insufficient for expanding fertilizer needs.

In accordance with this general movement there are now "high analysis" mixed goods, meaning any mixture containing 16 per cent or over of plant food; "double-strength" or double-analysis" mixed goods containing about twice the normal analysis, and also highly concentrated carriers of plant nutrients. These are particularly materials that contain large quantities of more than one plant food, as mono-ammonium phosphate, which supplies both ammonia and phosphorus in the one carrier. Interest is increasing in the use of such concentrated raw materials.

There is little doubt that all authorities support the use of "high analysis" mixtures as at present defined.

But regarding the extreme development of highly concentrated mixtures or materials, there are arguments involved in both the manufacture and the use of such fertilizers.

Spencer L. Carter, for instance, speaking before the convention of the National Fertilizer Association this year, pointed out that while the use of concentrated fertilizers is sound in theory, there are distinctly practical sides to the question. Continuing, he said that highly concentrated analyses alone would mean a reduced tonnage passing through the factory, which would require more working capital. Also, uses must be found for many low grade materials.

Some authorities have pointed out that "burn" may occur through too great a concentration of plant foods near the roots, though under proper conditions it has also been shown that concentrated fertilizers can be used without causing "burn."

It must also be observed that fertilizer materials may contain chemical elements as so-called impurities, that are beneficial to agriculture. Kainit, for instance, has beneficial effects other than supplying potash. The magnesia in many materials has also been found essential to prevent chlorosis of tobacco.

Thus, while the major trend is undoubtedly, and rightly so, towards a greater degree of concentration in fertilizer materials, there are other considerations that preclude at present our saying with any certainty, what is the final degree of such concentration that will be found the most practical and profitable.

Probably the recommendation of Professor Beaumont of Massachusetts in a paper read before the New England section of the Society of Agronomy is as sound as any. He said "Our recommendation in general will be for the material that furnishes a unit of plant food at the lowest cost—that there is in our fertilizer economics a place for both classes of materials, and that each material be considered in the light of the available knowledge concerning it."

Education is the cheap defence of nations.
—Burke.

THE RURAL LIFE PROBLEM IN THE EAST

ALTHOUGH similar in every section of the country, the rural life problem differs enough between East and West, North and South to need special thought. Fundamentally the problem in the East is different from any of the other geographical regions because of the greater competition between the agricultural and the industrial forces.

For generations there has been a constant drain of red-blooded young people from the farm to the city, and agricultural activities and social life on the farm have decayed on account of a deplorable lack of leadership. The young men and women with a high degree of initiative and leadership, with capacity of doing the big things of life, have been directed to the city, forgetting or perhaps never suspecting that the economic and social opportunities in the open country are unlimited, when directed by the right kind of leadership.

Rural decadence will of necessity result in national disintegration. Rome, in her desire to centralize all power and resources in the city, fell when that stage of reckless urban development was reached when her rural population was drained of its leadership. The power and world influence of a nation must surely pass away with the passing of material resources, for poverty is helpless and ignorance is the inevitable result of cancerous poverty.

Like characters beget like character, whether we will it or not, so it is important that our Eastern states bear this in mind. If draining the farms and farm homes of their initiative and leadership is continued, there necessarily will be left on the farm a lower type of civilization, a decadent civilization. Realizing that the permanency of our American democracy will be determined by the permanency of our agriculture and by the economic and social level of the farm, it is high time that the dominant forces of our agricultural and industrial civilization brush the cobwebs from their vision and read the handwriting on the wall "Any Civilization That Will Endure Must Be Based on a Prosperous and Permanent Agriculture".

Cotton is King or Slavery in the light of political economy.—David Christy.

THIS is being written at Poplarville, Mississippi. Mississippi produced last year next to the largest crop of cotton of any state in the South, nearly 2,000;000 bales. Texas was first.

MISSISSIPPI

A large part of this cotton was produced on the famous Delta lands between Vicksburg in the south and the northern boundary of the state. This area of land bordering the Mississippi river has been cultivated during recent years very much more intensively than ever before. This possibly is due to the building and care of the levees of the Mississippi river.

Thus Mississippi is vitally interested in cotton. She has no large cities within her borders. Her interests are fundamentally in the soil and the crops produced. Almost anybody can tell you when the first boll weevil appears, or whether the wilt is bad, and lately the bad effects of the cotton flea. Methods for protecting the cotton crop are therefore of popular interest everywhere. Whether aeroplanes can be used for protecting cotton in a more commercial way is much more than an economic question.

Next to crop production and producing good seed, there is a growing interest in the use of fertilizers. The agricultural experiment stations of the state are leading the way in making good progress in finding out what are the best analyses and materials to use to cheapen the cost of producing cotton.

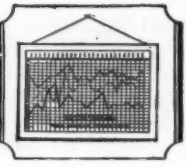
There are five stations in the state doing experimental work. The central or main station is located at the A. and M. College, Starkville, J. R. Ricks, director. The others are: the South Mississippi Branch Station at Poplarville, 70 miles from New Orleans, representing the coastal plains, E. B. Ferris, assistant director; the Holly Springs Branch at Holly Springs, located on the brown loam or loess soils in the northern part of the state, C. T. Ames, assistant director; the Delta Branch at Stoneville, representing the delta soils, W. E. Ayres, assistant director; and the Raymond Branch at Raymond, located on the brown loam soils of southwestern Mississippi with H. F. Wallace, assistant director, in charge.

During the last two or three years, under the supervision of Director Ricks, new plans for fertilizer experiments have been started. Among other important changes, fields have been leased which are adapted both in the type of soil and typography of the land for the best work in field experiments. A large number of fertilizer combinations are included in the experimental plans. The work will answer in a manner the two fundamental questions: What are the effects of each of the plant nutrients? and What amounts of each give the most profitable returns, particularly on cotton?

A very good experiment of this type is located on a farm leased by Director Ferris of the South Mississippi Branch Station. In addition to this the same type of experiment is being done in four or five counties under the supervision of the branch station.

This is very encouraging and the directors of the different stations are to be congratulated on the efforts they are making to solve cotton fertilizer problems. It is quite obvious that if the price of cotton remains low, the cost of production in which fertilizers play such an important part, will be a very vital problem. The western part of the Cotton Belt, as is well known, has not used so much fertilizer as North and South Carolina and the eastern part of the Cotton Belt generally. There is, therefore, greater need for experimental work and undoubtedly the work that the Mississippi experiment stations are doing will have a vital influence on the production of the big crops of cotton that the state usually produces.

AGRICULTURAL DEVELOPMENTS



By P. M. Farmer

The Little Barred Hen

One hundred and eleven eggs in 111 days in a row is the record of a Barred Rock hen owned by the University of Tennessee. This is a world record for the breed and misses the world's record for all breeds by only 16 eggs. After the long, non-stop record she missed a day and then continued for a long period thereafter. Although she hasn't beaten the world she does hold in addition to the record for her breed, the world's record for all heavy breeds, and the southern record for hens of all breeds for continuous laying. The hen's name is U. T. Queen.

Regular Feeding More Important Than Regular Milking.

Dairy specialists of the Department of Agriculture have been trying to find out if regular milking is as important as dairymen have long thought it. They found that with average to good cows milking at irregular hours had little effect on production. Irregular feeding, however, lessened production by about 5 per cent. It was also found that the old notion that cows give more milk if milked always by the same person was not backed up by experimental results. The difference was so small as to be hardly noticeable.

Scrape and Save

The evidence accumulates that corn growers in the United States for generations have been wasting time and labor in useless cultivations of their crops. It is now quite commonly conceded that weeds are the principal enemies of the corn grower and that when they are kept out it is unnecessary to disturb the soil.

Last year a member of Ohio's hundred-bushel corn club had started to cultivate his crop for the third time when he received a bulletin which counselled against cultivation beyond that needed for weed killing. After reading this advice he did not finish the row he had started and let all the rest of the field stand as it was after two cultivations. He grew 120 bushels to the acre, the second highest yield of the State for the year.

Experiments in 27 States show that fields in which the weeds are merely scraped off do as well as fields where the corn is cultivated. In fact, cultivation after corn has reached knee height is liable to do much damage to the roots which fill the ground between the rows. In Illinois one plot grown to corn for 25 years received nothing but scraping to remove the weeds and there was no appreciable difference in yield between it and the adjoining plot which was cultivated.

Save Red Clover

Dr. A. J. Pieters, Agronomist of the Department of Agriculture, says that the red clover crop in Delaware, Maryland, Virginia, West Virginia, Kentucky and Tennessee may be brought back to its

old importance by the simple expedient of developing strains of clover resistant to anthracnose. At present there is only one known resistant strain—one developed by the Tennessee Experiment Station several years ago — but little seed is yet available. Farmers are advised to locate resistant clover and save it for future seeding. By following this practice year after year a strongly resistant strain will be developed.

Cotton and Rubber

Three members of the Bureau of Plant Industry have recently returned from a three-months' inspection trip in the West Indies and South America. They report the discovery of several new types of cotton, some of them with characteristics that may be of value in practical cotton breeding work here. One of the new cottons has bracts open or turned back from the buds and young bolls so that little protection is offered for boll weevils or other pests and diseases. It is thought that such cotton also could be picked with less trash or broken bract material and the grades would therefore be improved.

The scientists also visited rubber experiments being carried on by the Department in Haiti and the Canal Zone and made a short expedition to the West Coast of South America and into Colombia and Ecuador. They report that tapping experiments on 20-year-old para rubber trees near the North Coast of Haiti show that it is not impossible to produce rubber from this tree in suitable locations in the West Indies, Central America and Mexico.

The Best Silage

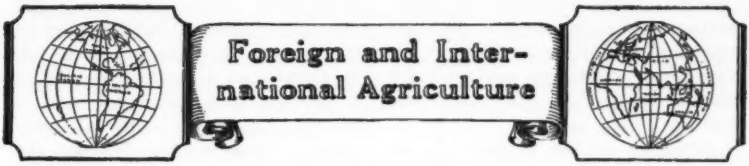
Results of new experiments by the Department of Agriculture show that the best corn silage is made if the corn is cut when 80 per cent of the ears are in the dough stage and 20 per cent in the milk stage. It was found that sunflowers are usually cut when too immature. Any time between the period when all plants are in flower and before the petals fall is usually good for harvesting this crop for the silo. Sudan grass may be cut at the early blooming or middle to late blooming stage.

Potash in "Quotes"

Down in Oklahoma they are having a good laugh at the expense of Henry C. Potts, Assistant Professor of Agronomy. Workmen had left a finely powdered substance on the floor of one of the rooms of the agronomy department. With a hasty glance Mr. Potts decided it was potash and thought it would do better work on one of his potato plots. It was sacked and put on the field. Later it was found that the material was Portland cement. The men who spread it over the potato patch are hoping they will not be asked to dig the potatoes.

Foot-and-Mouth Commission

The foot-and-mouth disease commission sent to Europe a year ago to study the disease and the methods of fighting it has just returned and is now in Washington working up the material for its report which it is thought will be issued some time late in the fall. Members of the commission are Dr. Peter K. Olitsky, of the Rockefeller Institute for Medical Research; Dr. Jacob Traum, of the University of California, and Dr. Harry W. Schoening, of the Federal Bureau of Animal Industry. They carried on work in France, Germany, England, Denmark, Sweden, Holland, Belgium, Switzerland, Austria, Hungary and Italy.



The purpose of this department is to help us understand the scientific, practical, and industrial agriculture of other countries and the international developments which result. The editor believes that such knowledge is now of the greatest importance in our agricultural prosperity. Every care is taken to insure accuracy—both of facts and their interpretation.

The British County Agent in Action

By H. R. Cox

Specialist in Farm Crops, New Jersey Agricultural Experiment Station

IT may be a surprise to some readers of BETTER CROPS that Great Britain has county agents. But such is the case. Indeed, all the more progressive countries of Europe have systems of agricultural extension teaching.

In Britain the county agent is known as the county organizer. His duties are of a three-fold nature: (1) classroom instruction, (2) establishing experiments and demonstrations, and (3) advisory. Instruction is placed first. The British organizer is first of all a teacher. Broadly speaking he is a combination of the vocational teacher and the county agent, as we know them. In order to give a more intimate picture of the organizer and his job let me introduce to you several of his kind.

J. C. Wallace is organizer in Holland county of Lincolnshire. This county is in the fen country about 100 miles north of London and is one of the richest agricultural districts in England. It is outstandingly a region of arable farming rather than livestock farming, and is devoted to the growing of potatoes, fruit, sugar beets and a large variety of other crops. It is about 20 miles square, being approximately the size of an average county in eastern United States.

Mr. Wallace has his headquarters at the village of Kirton. Here there is a Farm Institute consisting of a group of buildings having a value of perhaps $60,000. The home of the organizer is a part of the group. In addition to the organizer there is a staff of assistants. The staff consists of a biologist, a chemist, an instructor in poultry-keeping and an assistant to the organizer, all full-time workers. During the winter of 1924-1925 there were 16 regular students attending the institution, boys between 16 and 22 years of age. In addition, there were 6 part-time students. Mr. Wallace admitted that the number of students is smaller than is justified by the facilities at hand but stated that the institution is only 3 years old and that the attendance should grow. It may be stated that the

officials of the Ministry of Agriculture in London believe that the institute idea is something of an experiment, and they are not fully convinced that it will stand the test of time.

Attached to the Institute is an experimental farm of about 100 acres on which are employed from 12 to 14 laborers regularly and at times as many as 45. The lines of experimenting include extensive fertilizer trials on potatoes, clover and sugar beets; variety and seed source trials with potatoes, peas, cabbage, cauliflower, oats and sugar beets; trials on dates of sowing peas; trials on methods of and distances of sowing wheat.

This experimental farm has been in operation 4 years. There is an investment here of about $60,000. It is worthy of note that the difference between expenses and receipts is only about $1,000 a year on an average. The Ministry pays two-thirds of this deficit and the county council the remaining third. Much of the experimenting is carefully conducted and seems to be worthy of the name; some of it would probably not stand the close scrutiny of a research worker. This is the outstanding case in Great Britain of a fully developed county experimental farm. It is interesting to note that 750 farmers visited this farm in 1924. Apparently it has the enthusiastic support of the farmers of the county. It is a more popular branch of the organizer's work than is the Institute.

The time of the organizer and his assistants is largely taken up with the Institute and the farm, but they find opportunity to make farm visits and for attending farmers' meetings about the county.

The county of Derbyshire is more typically English than Holland county, being devoted largely to livestock husbandry with a large proportion of the land in grass. There are about 5,000 farmers in the county. The organizer, Mr. J. R. Bond, has a staff consisting of a horticultural instructor and a livestock instructor, who is a veterinary surgeon; he also has the part-time services of a poultry instructor who happens to be a public school teacher, a beekeeping instructor, an instructor in manual processes, and two women instructors, one of whom teaches butter and cheese making and the other cooking. Manual processes include blacksmithing, ditching, hedging and thatching.

EXTENSION work in Derbyshire represents the outstanding case in Great Britain in which instruction in day and night courses has been developed to a high degree. There is no farm institute in the county and the organizer does not believe in that method of agricultural instruction. He believes in spreading his efforts around the county and thus reaching more people. In 1922 there were day classes in agriculture held for men at 6 different centers with a total attendance of 147; and for women at 4 centers with an attendance of 77. The age of the students varied from 16 to 50 years, the majority being from 20 to 25 years of age. Besides these courses, there were organized series of night lectures for farmers at a number of points. Many of these night lectures were illustrated with lantern slides.

The staff in Derbyshire conducts less demonstration work than is the case in most of the other counties. Mr. Bond took me, however, to a farm on which he has been conducting pasture improvement demonstrations for a number of years, where I saw an excellent example of teaching by

demonstration. The farmer and his neighbors are fully convinced of the value of the methods shown.

The agricultural staff in Derbyshire does a great deal of an advisory character, although Mr. Bond stated that he never visited a farm except on request of the farmer and for his specific purpose. His office publishes a monthly paper called the "Derbyshire Young Farmer," having a circulation of about a 1,000 and a subscription rate of 50 cents a year. It carries advertising and more than pays for itself.

The cost of running the extension office in Derbyshire is about $25,000 a year, of which the Ministry of Agriculture pays about two-thirds and the county council the rest. The organizer has been an extension worker for 12 years. He has a flivver, many years old, with which he can stir up the dust with the best of them. He calls it a "Lizzie." Thus the twain shall meet.

Three counties in southern Scotland, Selkirk, Berwick and Roxborough are united in maintaining an organizer and his staff. The area covered by these workers is more than 1,000 square miles. The organizer is G. W. Howie and his headquarters are at St. Boswells. The staff consists of a horticulturist, a dairy instructress, a poultry instructress and a beekeeping instructor. There are 3 schools in this district where the staff teaches rural science to boys of 12 to 14 years of age. The course runs for 2 years and a session is held once a week. In addition to this instruction tnere are day and night schools held for older boys. As a part of the course in rural science to the younger boys the horticultural instructor maintains school gardens in which each student is allotted a small area for the raising of garden crops. The poultry instructress has a small poultry establishment near the school with a couple hundred birds which is managed by the students.

There are quite a number of experiments and demonstrations carried on by the staff in this district. All of them are conducted on farms rather than at a central station, and most of them are under the direct supervision of the organizer himself who is a crops and soils man. The lines have to do largely with fertilizer tests with potatoes and turnips, variety trials with oats and barley, and the improvement of permanent pastures by fertilization. Mr. Howie took me to one of the potato fertilizer experiments. It consists in comparisons of different amounts of potash in one group and different amounts of nitrogen in another, both series run in duplicate. Such tests are usually run for several years, but not on the same field. He also showed me an oats vari-

Mr. Howie looking at pastures | *With his car in front of his office* | *Talking to one of his beef cattle farmers*

ety experiment which consisted of single plats of each of a half dozen varieties.

We also visited a pasture improvement demonstration, then in its second year, consisting of 4 plats of 5 acres each. Each plat is treated with different fertilizer applications. The measure of results is the increase in weight of the several flocks of sheep on the plats. This is the approved British method of gauging the results of pasture improvement.

Mr. Howie and his assistants have more or less consulting work to do. He also makes a practice of visiting, nearly every week, 2 or 3 of the farmers' markets of which there are a number in the district. Farmers' markets are common all over Great Britain. They are held largely for the purpose of selling livestock and other farm produce. The organizers use these markets as an opportunity of making contact with the farmers.

Mr. Howie drives a Morris-Cowley roadster on his official rounds. This probably comes nearer than any other make of car to being the flivver of Great Britain. He owns the car, as is the case with all other organizers, and receives 12 cents a mile for its operation on official business. He has a Truog soil tester in his office and believes that it is fairly useful. He has no stenographer but does his own typewriting; this is typical of the British extension offices.

One of the most notable differences between agricultural extension work in Great Britain and the United States is that in the former country it has come about by gradual growth, step by step, taking a certain direction here and a little different direction there; while in the United States the entire system as it exists in the northern and western States was largely created at one time and was superimposed on the several states, resulting in a fairly uniform system throughout.

The field tests conducted by the organizers are of quite a wide range and of varying character. Sometimes these tests are merely demonstration and are of value as such. More often they are intended to be experiments for the purpose of learning something, and here is a matter which is causing considerable comment among the agricultural authorities in Great Britain. There is a feeling among some of the leaders that most of this experimenting has been too carelessly done to justify definite conclusions being drawn from it. In this country we have wisely avoided this pitfall by recognizing the difference between experimenting and demonstration and in confining our extension activities to the latter phase.

The organizers and their assistants seem to be well trained for the most part and to be of a high type. They are probably more broadly educated than our own people. They are a little older and more mature than our people and their tenure of office has been somewhat longer. I found a number who had been in agricultural extension work for 15 and 20 years.

As to salaries, it would seem that the county organizers were about as well paid in proportion to the cost of living as in our country. In England the salary range is from $2,000 to $3,500 a year for the organizer, less, of course, for his assistants. In Scotland the organizer starts at about $1,200 a year. As a result of the lower salary range in Scotland some of the Scotch extension people have been lost to England. A number of women extension agents have been employed in Scotland. The thrifty Scot has learned that women work for less than men.

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS would provide a complete index covering all publications from these sources on the particular subjects named.

One of the most interesting of the bulletins which have come to hand this month is a resume of the county agricultural agent work under the Smith-Lever Act 1914-1924. This is U. S. Department of Agriculture Miscellaneous Circular No. 59 dated May, 1926, and written by William A. Lloyd, in Charge of the Western States, Office of Cooperative Extension Work. The bulletin starts with a bit of history as to the origin of farm demonstration work and follows down through the important projects which have been worked out within the decade. This is a bulletin which should prove not only interesting for County Agents and Vocational Teachers, but to everyone who is interested in the improvement of American agriculture.

Fertilizers

"Fertilizers for Irish Potatoes," Agricultural Experiment Station, Fayetteville, Arkansas, Bulletin No. 206, May, 1926. J. R. Cooper, C. W. Rapp.

"Making the Most of Manure," Timely Soil Topics, Ohio State University, Columbus, Ohio, Radio Lecture No. 6, No. 97, June, 1926.

"Cabbage Fertilizers," Truck Crop Investigations, Virginia Truck Experiment Station, Norfolk, Virginia, Bulletin 50, January 1, 1925. H. H. Zimmerley, M. M. Parker.

Department of Agriculture Immigration, Richmond, Virginia, Bulletin No. 233, July, 1926.

Soils

"Soil Survey of Iowa Woodbury County," Agricultural Experiment Station, Agronomy Section, Soils, Soils Survey Report No. 40, May, 1926. Ames, Iowa.

"Influence of Nutrient Supply on Earliness of Maturity in Cabbage," Agricultural Experiment Station, Horticultural Section, East Lansing, Michigan, Technical Bulletin No. 75, March, 1926. J. B. Edmond, E. P. Lewis.

"Soil Productivity as Affected by Crop Rotation," United States Department of Agriculture, Washington, D. C., Farmers' Bulletin No. 1475, May, 1926. Wilbert W. Weir.

Crops

"Directions for Grading and Packing Illinois Peaches," Agricultural College and Experiment Station, Urbana, Illinois, Circular No. 310, June, 1926. J. W. Lloyd.

"Productiveness of Varieties of Winter Wheat in Illinois," Agricultural Experiment Station, Urbana, Illinois, Bulletin No. 276, June, 1926. Robert W. Stark.

"Cost of Producing Field Crops in Three Areas of Illinois 1913-1922," Agricultural Experiment Station, Urbana, Illinois, Bulletin No. 277, June, 1926. Emil Rauchenstein, R. C. Ross.

"Reducing Grain Losses in Threshing," Agricultural College and Experiment Station, Urbana, Illinois, Circular No. 311, June, 1926. I. P. Blauser.

"Timothy-Pro and Con," Crop Talk. Ohio State University, Columbus, Ohio, No. 35, June, 1926.

"Muskmelons," United States Department of Agriculture, Washington, D. C., Farmers' Bulletin No. 1468, April, 1926. W. R. Beattie.

Economics

"Farm Economics," June 25 Cotton Report, Cooperative Extension Work in Agriculture and Home Economics, Alabama Polytechnic Institute, Auburn, Alabama, Vol. 1, No. 13, July 6, 1926.

Diseases

"The Mint Flea-Beetle," Agricultural Experiment Station, Entomological Section, East Lansing, Michigan, Special Bulletin No. 155, June, 1926. L. G. Gentner.

"The Mexican Bean Beetle," North Carolina State College of Agriculture, Raleigh, North Carolina, Extension Folder No. 22, June, 1926. C. H. Brannon.

"The Clover Leaf Weevil and its Control," United States Department of Agriculture, Washington, D. C., Farmers' Bulletin No. 1484. W. H. Larrimer.

Insects

"Leaf Scorch Disease of Strawberries," Agricultural Experiment Station, State College Station, Raleigh, North Carolina, Technical Bulletin No. 28, April, 1926. Frederick A. Wolf.

"Potato Wilt and Its Control," Oregon Agricultural College Experiment Station, Corvallis, Oregon, Station Bulletin 221, March, 1926. M. B. McKay.

"European Canker of Pomaceous Fruit Trees," Oregon Agricultural College Experiment Station, Corvallis Oregon, Station Bulletin 222, March, 1926. S. M. Zeller.

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Unbending Backs in Farming

(*From page* 15)

against the rapidly revolving teeth of steel which, with apparent ease, sever "in twain" the most stubborn logs.

The circular saw rig is now attached in one of several ways, but always with an idea of saving time and physical energy. Many farmers have the gas engine and the circular saw on separate frames with the latter either stationary or portable; but the newer types of circular saws are built on the same frames as their engines, and are portable.

Some agricultural engineers are now recommending that the circular saw be attached to a special frame, and be hinged to the tractor. By this device, the pulley power of the tractor may be used.

Farmers who have to do much sawing of heavy logs find the drag saw more convenient. The drag has an advantage over the circular saw in that it requires less physical labor in operation. The sawing edge is raised, lowered, and drawn back and forth on the log through the operation of transmission lines, run over pulleys, by power from the gas engine.

Certain types of drag saw rigs now in use, have what is known as a moving log slide. When the saw is in operation, the logs pass slowly along the slide by means of a series of rollers, a cable, and a log hook. As the log is passed beneath the saw a definite distance, the sawing edge is lowered, and sawing commences. In other words, the machine is so regulated, that the length of time to raise and lower the saw is equal to the time required for the log to advance in position for the next cut. Such a device, although slower in action than the circular saw, makes it possible for one man to operate it while attending to such duties as the splitting and piling of logs, already sawed, into equal lengths.

True to its name as a general farm labor saver, the gas engine now invariably functions in furnishing the power for wood sawing apparatus. Farmers, fortunate in having two engines, use one to do the heavier work of wood sawing, feed grinding, and threshing, and reserve the engine of lesser power for such tasks as water pumping, milk separating, and running the washing machine.

However, engines with three to five horsepower are sufficiently capable of sawing most farm supplies of wood.

These and other powerful farm machines are doing much to lighten the labors of the farmer. Instead of discouraging the prospective farmer with the back-breaking tasks, such inventions bring a promise of greater enjoyment to be derived from the business of farming.

The power saw is only one of the miracles of modern farming.

Utah

(*From page 28*)

of Jesus Christ of Latter Day Saints, commonly known as the Mormon Church. For several years past, also, he has been associated in the work of adjusting affairs on federal reclamation projects.

Dr. P. A. Yoder, now engaged in sugar cane investigations with the United States Department of Agriculture, was director of the Utah Experiment Station from 1905 to 1907, when he was succeeded by Dr. E. D. Ball.

Dr. Ball directed the affairs of this station through a longer period than any of his predecessors or, thus far, his successors, having served from 1907 to 1916. He will be remembered by agricultural investigators in all parts of America as the first director of research in the U. S. Department of Agriculture, a position from which he resigned in 1925.

With the succession of Dr. F. S. Harris to the directorship in 1916, a young, highly-trained investigator in the newer school of agricultural thought, assumed the leadership of Utah's experimental forces. Dr. Harris, an agronomist by profession, was an assistant at the Utah Agricultural College during Dr. Widtsoe's administration, and later took his doctorate at Cornell University. For five years he was director of the Utah Experiment Station, from 1916 until 1921, when he was elected president of the Brigham Young University, a position still held by him.

Dr. Harris was succeeded as director by Prof. William Peterson, incumbent, who already had established himself as a leader in the labor of promoting the rural welfare of Utah. Born and reared to young manhood on a ranch, he brought to his position as director an intimate knowledge of the most important phase of agriculture in this State, the range livestock industry. A geologist by profession, a keen student of the native rock origin of Utah soils and an investigator of possible surface and underground water supplies, he is unusually well qualified to deal with the major problems confronting his state today.

There are upwards of 40 investigators on the staff of the Utah Experiment Station, each of whom is striving to contribute something in his special field that will help to advance the type of agriculture peculiar to irrigated mountain valleys, Alpine summer ranges, and vast stretches of desert winter range.

AT different times during the last 35 years the staff of this station has included the names of some of America's best known agriculturists. Besides those already named, a few of the leaders include Secretary of Agriculture W. M. Jardine; U. P. Hedrick, widely known horticulturist; F. D. Farrell, president of Kansas State Agricultural College; J. M. Stephens, associate agriculturist in charge of Dry Land Agriculture, U. S. Dept. of Agriculture; J. T. Jardine, director Oregon Agricultural Experiment Station; A. C. Cooley, in charge of demonstration work on federal reclamation projects; F. B. Linfield, director Montana Experiment Station, and many others.

As for the work in field crops, the following statement by Prof. George Stewart, agronomist, is enlightening:

"Farm crops work at the Utah Agricultural Experiment Station falls under five chief headings, cereal investigations, dry farming, rotations and manuring, irrigation, and alfalfa seed problems.

Cereal Investigations

"It has been found that practically all common cereal varieties consist of several pure lines. The most common variety of winter wheat in Utah is Turkey, and of spring wheat Dicklow. Both of these varieties have been carefully selected and a pure line of each variety has been isolated and is being distributed in the state. The chief problem in the case of Turkey wheat is drouth resistance. Kanred wheat is somewhat superior to ordinary Turkey in Utah, but our selected strain of Turkey is fully as good, if not slightly better than Kanred. A pure line of Dicklow wheat has been selected for spring planting under irrigation; this strain is somewhat shorter and stiffer of straw, and yields somewhat more than ordinary Dicklow. It is at the present time competing in the State for acreage.

"Selection alone will not accomplish the entire purpose of cereal improvement. Hybridization has therefore been resorted to and crosses between such varieties as Sevier and Kanred, Sevier and Dicklow, and Sevier and Federation have indicated that considerable is to be expected by uniting the good qualities of these varieties. The good quality and high yield of Dicklow can apparently be maintained and at the same time there can be added to it a certain degree of rust resistance, of drouth resistance from the Sevier parent. When completely ripened, the Dicklow variety is rather bad to shatter. This is completely overcome in the cross mentioned. The cross between Sevier with Federation has given us somewhat stronger straw and it may be that the yield will be as good as in the Dicklow-Sevier cross, although as yet it has not been possible to test this.

Dry-Farming

"One or two rather interesting things have come out of the dry-farming tests. The old idea that two or three pecks of seed to the acre was sufficient on the dry farm has been completely refuted, six pecks having been found much more desirable and much safer.

"The value of summer fallow was formerly thought to be almost entirely a question of the storage of water. It is now known that the accumulation of plant foods, especially nitrates, is almost, if not fully as important, as is the storage of water. There is no doubt, in the Great Basin, that summer fallow is required in order to get good yields, but curiously enough, wheat followed by potatoes or by corn will permit as good a yield of wheat the next year as will summer fallow, the question, therefore, is whether or not corn, potatoes, or other cultivated products, such as beans, might be grown profitably as regards their own production. Continuously cropped land becomes very foul with weeds and becomes unfavorable in its structure for further cropping.

Rotation and Manuring

"Seven different rotations without alfalfa failed entirely to maintain the productivity capacity of the soil, but when alfalfa is added, the problem is almost entirely solved, if just a little farm manure is added to critical crops. The yield of crops is fully as good when alfalfa is grown five years followed in turn by potatoes, sugar beets, peas or beans, sugar beets and small grain, as a nurse crop to re-seed the alfalfa. When only three years of crops in this rotation receive manure, the yield of beets, potatoes and grain are almost identical with the same crops

grown under constant cropping when the land is receiving a manuring of 10 tons to the acre every year. That is, the rotation is taking the place of about 70 per cent of the manure. In spite of this, however, rotation by itself, even with alfalfa, does not maintain the productivity of the soil as measured in crop yields.

"It is evident, therefore, that a combination of crop rotation and farm manure is highly important.

Irrigation

"It has been clearly established that when land must be irrigated in order to establish the crop, it is much better that it be irrigated before the crop is seeded rather than afterwards. Crops should never be left to suffer for water, as they do not fully recover from the setback. Some diseases readily attack plants suffering from lack of moisture. This is particularly true of sugar beets. One of the worst sugar beet diseases, *Phoma beta,* is almost entirely prevented by maintaining a moisture supply in a combination of manuring, rotation and irrigation. Excessive quantities of water are wasteful for seed production.

Alfalfa Seed Problems

"Most of the reasons why alfalfa will set seed in one locality and not in another are at the present unknown. Some investigators feel that moisture is the important factor. Others feel that the time at which the seed crop is allowed to begin growth overshadows the moisture supply. Still others feel that the presence of bees or of even certain weather conditions are the determining factors. This problem is now being investigated on an exclusive alfalfa farm in the Uintah Basin, which is one of the best seed-producing sections in the United States. It is hoped that it will be possible on this farm not only to determine these factors, but ultimately to produce higher-yielding strains for seed production, and also to find some strains that will be adaptable to the most strenuous conditions of the northeastern part of the United States and adjacent parts of Canada, both as regards cold resistance and yield. In order to bring about these results, nearly all common varieties are being tested. Unfortunately the results from these investigations have only just begun."

The close of day out where the West has begun

Kentucky Blue Grass

(*From page* 19)

of 3.5 per cent milk per day. Three types of 1,200-lb. cows are used in the computations; those producing 20, 35 and 50 lbs. of milk per day. In making these computations, it is recognized that a cow producing more than 25 lbs. of milk per day should be provided with sufficient concentrates other than the feed secured in the pasture to furnish the necessary total digestible nutrients for maintenance and production.

Feeding concentrates to grazing dairy cattle has been shown to be an economical practice. The animal is kept in better physical condition throughout the summer and goes into the winter feeding period more capable of a uniformly high milk production. A 1,200-lb. cow, yielding daily 30 lbs. of 3.5 per cent milk, will require for maintenance and production an average of 2.49 lbs. digestible crude protein and 18.51 lbs. total digestible nutrients. Eighty pounds of green Kentucky blue grass will furnish 2.96 lbs. digestible crude protein and only 12.72 lbs. total digestible nutrients (Henry's Feeds and Feeding, pp. 747 and 739). The difference of 5.79 lbs. of total digestible nutrients should be supplied by supplementary feed.

Green pasture grass, especially Kentucky blue grass, is a high protein feed with a nutritive ratio of 1:3.3, which should be modified with supplementary feed to a ratio of at least 1:6.6. Table 1 shows the computed value of pasture on the basis of five months of continuous grazing (May 10-Oct. 10). The feeding value of the pasture is based on the difference between the cost of feed on pasture and on a dry ration.

The cow producing only 20 lbs. of milk daily is maintained on pasture without supplementary feed. Her dry ration, off pasture, consists daily of 8 lbs. alfalfa hay, 35 lbs. corn silage, 1 lb. gluten feed, ½ lb. cottonseed meal, ½ lb. linseed meal, and 4½ lbs. corn and cob meal.

The cow producing daily 35 lbs. of milk is fed, in addition to pasture, 8 lbs. of corn and cob meal per day; dry ration (off pasture); 10 lbs. alfalfa hay, 35 lbs. corn silage, 6 lbs. corn and cob meal, 1½ lbs. wheat bran, 1 lb. gluten feed, 1 lb. linseed oil meal, and ½ lb. cottonseed meal per day.

The cow producing 50 lbs. milk per day is fed in addition to pasture 10½ lbs. corn and cob meal,

Table 1. Computed Value* of Kentucky Blue Grass Pasture Furnishing 80 Pounds of Green Grass Per Day for a Period of 150 Days**

	Cost of Feed for 150 Days		
	Pasture	Dry ration off pasture	Difference in favor of pasture
1,200-lb. cow, 20 lbs 3.5% milk per day....	....	$44.67	$44.67
1,200-lb. cow, 35 lbs. 3.5% milk per day....	$19.20	56.74	37.54
1,200-lb. cow, 50 lbs 3.5% milk per day....	33.84	71.12	37.28
Average	$17.68	$57.51	$39.83

* The sweet clover is not included in this or subsequent computations.

** The authors acknowledge the valuable assistance of Prof. S. I. Bechdel in the computations of dairy rations used.

Table 2. Computed Acre Value and Carrying Capacity of Kentucky Blue Grass Pastures in Relation to Fertilizer Treatment

Treatment Soil	Annual Cost Fertilizer and Lime Treatment	DeKalb Soil Acres Required Per Cow	DeKalb Soil Annual Acre Value	Volusia Soil Acres Required Per Cow*	Volusia Soil Annual Acre Value	Westmoreland Soil Acres Required Per Cow*	Westmoreland Soil Annual Acre Value
Untreated ..	....	...	....	40.67	$ .98	4.09	$9.73
Ca	$2.25	37.1	$1.08	2.54	15.68	1.83	21.76
CaP	4.04	1.72	23.15	1.96	20.32	1.24	32.12
CaPK	5.35	1.41	28.24	1.31	34.05	1.15	34.63
CaPKN	10.56	1.01	39.43	0.89	44.75	0.82	48.58
CaNP	8.52	1.43	27.85	0.99	40.23	1.01	39.43

* Average pf. three checks.

2 lbs. wheat bran, and 1 lb. gluten feed per day; dry ration (off pasture) 40 lbs. corn silage, 12 lbs. alfalfa hay, 6 lbs. corn and cob meal, 3 lbs. wheat bran, 2 lbs. gluten feed, 1 lb. cottonseed meal and 1 lb. linseed meal per day.

The cost of feed is based on Pennsylvania prices from January 1 to October 23, 1924. The prices per hundred weight are as follows: Cottonseed meal $2.77, linseed meal $2.38, gluten feed $2.30, wheat bran $1.73, corn and cob meal $1.60, alfalfa hay 90c, and corn silage 30c.

The figures in column 3 of table 1 should not be confused with acre value, but represent the value of an area capable of producing 12,000 lbs. of green grass throughout a period of 150 days. Table 2 shows the acre value and carrying capacity in relation to several fertilizer treatments. The carrying capacity is obtained by dividing 12,000 (pounds green grass necessary for summer maintenance per head) by the yield in pounds per acre of green grass. The acre value is obtained by dividing the acres required to supply 12,000 lbs. green grass into $39.83, which represents the average value of 12,000 lbs. green pasture grass as shown in table 1. The annual cost of fertilizer treatment shown in the second column is computed on the basis of Pennsylvania market prices for raw materials applied as home-mixed goods. Limestone is computed on the basis of one ton applied over a four-year period at a cost of $9. A detailed discussion of pasture fertilization, involving the use of home and factory mixed goods, will be given in the succeeding pages.

The relative value of mineral fertilizers on the three soils is clearly shown in the above table, both in relation to increased acre value of pasture and decreased acreage required to maintain a dairy animal. The addition of acid phosphate to the limed land increased the acre value of DeKalb soil $22.07, Volusia soil $4.64, and Westmoreland soil $10.36.

Potash applied to the land treated with limestone and acid phosphate increased the acre value on DeKalb soil $5.09, Volusia soil $13.73, and Westmoreland soil only $2.51. In like manner nitrate of soda applied to the land treated with limestone, acid phosphate and potash gave an increased acre value as follows: DeKalb soil $11.19, Volusia soil $10.70, and Westmoreland soil $13.95. The value of the re-inforced manure is

on an average $8.42 below that of the complete fertilizer.

The use of a complete fertilizer on the limed land has increased the acre value on an average $31.41 as compared to $22.99 for manure. The acre value of summer pasture, where complete fertilizer was used, is $44.25 on an average of the three soils. This value may appear high due to the fact that our conception of the value of pasturage has been based on the present existing grazing land too often found on areas unsuited for the best development of economic grasses.

The relative value of the several soil treatments in the production of Kentucky blue grass may be emphasized by computing the acres required to maintain an average herd of 20 dairy cows for a period of 150 days. The following summary shows the reduction in acreage brought about by the several treatments shown in Table 2.

Computed Acres of Pasture Required for Maintenance of 20 Cows for 150 Days

Soil Treatment	DeKalb Soil	Volusia Soil	Westmoreland Soil
Ca	742.0	50.8	36.6
CaP	34.4	39.2	24.8
CaPK ...	28.2	26.2	23.0
CaPKN ..	20.2	17.8	16.4
CaMP ...	28.6	19.9	20.2

* * *

New "Prunes" for Peaches

(*From page* 13)

buds left got more water and plant food, and thus made a better growth. However, this heavy pruning tended to dwarf the tree and such heavily pruned trees were not capable of producing much more than one and one-half bushels per tree when in full bearing.

Orchard fertilizer experiments in the past few years have demonstrated clearly, that contrary to our former belief, nitrogen is a very desirable fertilizer to apply to peach trees. Many experiments show that yields have been increased two or three times by the use of nitrate of soda. The discovery that Paradichlorobenzene would thoroughly control borers was very valuable and important. It is not necessary now to cut or injure the tree with wire and knives in searching for borers. Neither are any of the borers missed when this material is applied about the tree trunks.

The growers have gradually come to realize that it is better to grow the kind of cover crop which will thrive under their conditions. As a result instead of attempting crimson clover in many orchards, a mixture of rye and vetch is used. By sowing this mixture during the middle of August, excellent cover crops are generally secured. This means that large amounts of organic matter can be plowed into the soil. As a result such soils absorb and hold moisture better and gradually become more fertile.

As a result of the change of fertilizer and cover crop practices, and the newer methods of borer control, it seems sensible to suppose that peach trees can be pruned lighter, thus making a bigger tree, capable of bearing much larger crops. Experiments carried on by the Department of Horticulture at the University of Maryland have shown that this is true.

Wheat Fertilizers for Sassafras Soils

(*From page* 8)

or potatoes may not respond as much to applications of potash as wheat that follows wheat, corn or soy beans.

Proper fertilizers do more than increase the yields, they increase the quality also. Quality is determined largely by the test weight per bushel, although other factors such as foreign material and moisture content enter into the final classification. The test weight on the unfertilized plot averaged 51.6 lbs. This would grade according to the U. S. grain standards No. 5 if it meets the other requirements of foreign material and moisture content. Nitrate of soda does not increase the grade any. Acid phosphate raises the test weight and makes it eligible for No. 4 grade. Muriate of potash raises the test weight and makes it eligible for No. 2 grade. Combinations of two or three fertilizer materials do not raise the test weights any higher. Some of them do, however, as aforesaid increase the yield. Manure makes the wheat eligible for No. 3 grade.

The grade of wheat produced has an influence upon the net returns. The same value was used in figuring net returns from all plots as given in table I, but there is usually a difference of about three cents per bushel between the grades, i. e., if No. 1 wheat is selling at $1.28, No. 2 will probably be $1.25, No. 3 $1.22, No. 4 $1.19, and No. 5 $1.16. The range in the grades is from No. 5 on the unfertilized and nitrate of soda plots to No. 2 on the muriate of potash, acid phosphate-muriate of potash, and complete fertilizer plots. The difference in the price of grades No. 2 and 5 is nine cents. Muriate of potash alone makes this possible. However, the addition of acid phosphate and nitrate of soda increases the yields of the higher grade thereby making possible greater net returns.

Plate IV. Received 120 lbs. muriate of potash, 250 lbs. acid phosphate and 125 lbs. nitrate of soda. Average annual yield 28.9 bu. per acre for 15 years. Delaware Agricultural Experiment Station

Getting Educated on Quack Grass

(*From page 22*)

to his buckwheat money gave him a bank account of over $2,000, a very comfortable sum with which to begin his quest for an education.

"Son," said old Bill, as Billy was about to board the train which would convey him to the Agricultural College, "this is a proud moment for your old dad. You have earned your own money for a good start in college, and the best thing about it all is that you earned it by combining good horse sense and hard work. And not only have you earned this money for yourself, but in so doing you have left the old farm in better shape than it was when you started. You have made more than two stalks of alfalfa grow where one of quackgrass grew before, thereby outdoing that old proverb about the fellow who made two blades of grass grow where one grew before. When you get started in your college work you are pretty sure to run up against problems that look kind o' hopeless, like that field of quackgrass did two years ago. When these 'weedy fields' bob up in your college work you just go at 'em the way you did that 20 acres of quackgrass and you'll make the grade all right."

"All right Dad, I'll do my best. But I'll never forget that I could never have done anything without your help and sympathy, and that it was our success, not my success. Good bye, Dad! Will be back home for Christmas."

* * *

A New Raspberry

(*From page* 18)

Besides being suitable to sections where no other varieties will grow, the Van Fleet has many other desirable qualities. It is highly resistant to the diseases of raspberries which have largely prevented their culture in the South. It is characterized by its vigor, health, and productiveness of the bush, and its late ripening season. It is probably not suited for a general market berry, but is of considerable value for home use and local markets.

Its fruit is dull red in color, medium in size, and will not decay so quickly as the other sorts. It is very hardy and starts growth early in the spring. In 1923 canes of the Cuthbert variety were killed to the ground by hard freezes at the department station in Maryland, while those of the Van Fleet close by were uninjured and matured a full crop.

The new variety is a cross between the common red or Cuthbert raspberry and a wild raspberry imported by the department from Temperate Asia. Seed was first sent to the department in 1910 and planted at Chico, California. The late Dr. Walter Van Fleet, at that time superintendent of the United States Plant Introduction Garden at Chico, hybridized it, propagated it, and carried it along for many years in exhaustive tests before it was released to cooperators..

Thus, the Van Fleet raspberry is another of the many instances of the use of foreign wild plants in developing a wider range of plant and crop growth in this country.

Farmers of the Future

(*From page 27*)

It is a significant fact that within a year after the signing of the Smith-Hughes Act, every state in the Union had signified its intention of taking advantage of it and had committees or legislation under way leading toward its adoption. This was not the case following the passage of the Morrill Act. Nearly the first 40 years after its passage was spent in establishing schools, gathering together faculties, finding out what to teach and how to teach it and in arranging courses of study. In about one-fifth of this time the secondary schools have gotten under way. They have well defined courses in the trades and industries, in fact many trades and industry schools were already established and had only to make such changes as were necessary to conform to the Smith-Hughes law. With agriculture however this was not the case. It was evident that there should be two divisions, one dealing with agricultural phases and the other with the mechanical phases of the farming business. In the smaller schools both of these units are handled by one teacher, but as the number of students increases, two or more teachers become necessary.

The agricultural courses were very naturally patterned after those given in the colleges of agriculture and four-year courses were outlined. It was found however that the high school student was different from the college student, he still had some English and mathematics to learn and had to have time in which to do it. He would not study at home and was not yet mentally developed to the point of being able to grasp some of the more difficult basic principles.

This of course necessitated a revision and simplifying of both the agricultural and mechanical courses and shortening of the courses so that now in many cases the courses have been cut down to two years. This readjustment has led to two different methods of teaching, one called the individual project method wherein each student takes up some problem such as growing an acre of corn, raising a litter of pigs, starting a poultry flock, caring for an orchard, or raising a pet lamb, the other is the class project method in which the whole class undertakes to work out a problem such as feeding a carload of cattle or sheep, spraying an orchard, dehorning cattle or docking lambs. Both methods are good and many times the one followed depends largely upon the teacher, the cooperation of the parents, and the general system of farming followed in the locality where the teaching is done.

What will be the result of this educational system? It is probably too soon to foretell. However one advantage stands out clearly. Out of every 100 students who enter school, statistics show that about 35 enter the high school where they may at least be exposed to this agricultural education. With many "it takes" as is shown by the fact that by far the larger number of Smith-Hughes students take up the work the second year that they are in high school. Also there will probably be at least one-fifth of our future population that will know more about agriculture than was possible prior to 1917.

One of the difficulties encountered—perhaps it is not a difficulty, but a good thing—is that the boys from the country, who have a good country life basis for an agricultural education, have had all

Machine for making rope from binding twine made by students

they want of the country and start in to educate themselves for some job in town. On the other hand the town boys long to get into the country and take agriculture so that they won't be "so green" when their longing is satisfied. Perhaps this is as it should be, these town lads will learn to take the advice of the county agent and the extension specialists and will make the better farmers.

But the question yet remains, where are our future farmers coming from? Are they going to be boys raised in town, who have taken agriculture in the high school and migrated to the farm, or are they going to be the more sensible country lads, who realize that having been raised on a farm, they know a whole lot about it and that by taking the agricultural course they can make farming a more enjoyable job than one that would bring in the same return in town.

One thing seems certain, our future farmer is going to be a better educated man, is going to know more about his business. The day is not far distant when the man who has failed at everything else will also have failed at farming.

Coming Through the Alfalfa

(*From page 26*)

many others I have known, one can pay eight per cent for lime or necessary fertilizers, and have quite a lot of money left after the increases due to treatment have been used to discharge the interest accrued. I doubt if many farmers can profitably use 8 per cent money on ordinary farm operations but on basic improvements, for those things that are necessary to make the land produce, they can.

Vagrant acres! This is one of the very malignant cancers on the body of profitable farming. Farmers do something that very few other property owners do—they pay taxes to the center of the road hence there are some unavoidably vagrant acres on every farm, since in most states the owner of livestock pasturing on his own road is liable if damage comes to an autoist who runs into the owner's cow while pasturing on her master's land. It's a funny world we live in at that.

When I looked this place over, I found that while the deed called for 122 acres, there were only about 100 acres that could be plowed before further laborious work was performed. Some well-meaning but poorly directed soul in the years gone by had planted rods and rods of osage orange hedge. As these had grown, rather than trim them the owner had just crowded back a little farther into the field. Had he lived on the farm 25 years longer, he would have been farming a little circular spot in the middle of a ten-acre plantation of osage orange. Besides these hedge rows, the farm was ridden by fence rows that

(*Turn to page 60*)

Selling Service with Fertilizer

By *Weller Noble*

Chairman, California Soil Improvement Committee

¶ This is part of an address delivered before the California Fertilizer Association. It contains formulas for better business

THERE is no such thing as a perfect salesman—but everyone of you can strive towards perfection. In your efforts to accomplish this, there must be a service rendered. The first duty, although you perhaps do not all agree, in my opinion is to the customer. To properly serve the customer, a salesman's qualifications should include—

FIRST: A knowledge of fertilizers.

How many of you have really studied the subject? Do you know the elements that compose the average soil, namely nitrogen, phosphorous, potassium, calcium, magnesium, iron, alumina, carbon, sulphur and silica?

Do you know the approximate amounts of nitrogen, phosphoric acid, potash, lime and sulphur contained in the average soil and the amount of insoluble matter called silica, or sand?

Do you recognize promptly the various types of soil, ranging from sandy loams to adobe; and know the difference between nitrogen and ammonia, phosphoric acid and bone phosphate, or tri-calcium phosphate, muriate and sulphate of potash?

Do you know, in a general way, how nitrate of soda and blood are used in fertilizers, sulphate of ammonia, tankage, potash, nitrate of lime, ammo-phos, superphosphate, treble superphosphate, fish meal and other materials are manufactured?

Do you know the chemical formulas for lime and gypsum and the approximate reaction in the soil from their use, and the benefit, if any, to be obtained under certain conditions?

There is nothing secret about the fertilizer business. You can secure volumes in almost any library that will give you all of this data, and some relating to chemical formulas, soils, etc., and you need not be a chemist to read such works and benefit thereby.

Do you know how our fertilizers are prepared, and all the common questions that would be asked by a farmer relative to the various amounts of plant food in them?

You cannot gain the respect and confidence of your customer if you do not know your goods.

SECOND: Do you recognize the common scales and insect pests,

such as black, red, purple, citricolo and San Jose scale, thrips, mealy bug, wooly aphis, leaf hopper, red spider, tuber moth, wire worm, cut worm, eel worm, silver mite, phylloxera, asparagus centipede, red humped caterpillar, and other common forms of pests? Also, in general, how they spread —and at least the usual methods of eradicating them?

Do you know the dosage used in fumigating different sized citrus trees? Do you know at least some of the arsenical, lime-sulphur, bordeaux, nicotine and oil sprays, their method of preparation and approximate value for different purposes?

Do you recognize readily the different forms of gummosis, chlorosis, curl leaf, brown rot, black measles, pear blight, California vine disease, die-back, sour sap, pea and tomato wilt, fusarium wilt and rhizoctonia, and other common diseases?

I am not endeavoring to give a full list, but to mention some of the more common diseases, scales and insect pests, readily found in almost every section in California.

Can you be of any assistance to the farmer in helping him through your authoritative knowledge of the subject?

I have known of salesmen endeavoring to sell fertilizer for the express purpose of setting a crop of oranges on trees so badly infested with black scale that most of the sap was absorbed by the scale, leaving an undernourished fruit bud and with a result, naturally, that practically all of the fruit dropped from the trees in June or July. Another instance, also, of where the soil was so badly impregnated with fusarium wilt that not one potato seed would sprout, whether fertilizer was applied or not. The inevitable result went further than an actual loss sustained by the farmer—the fertilizer industry received a black eye, not through the malicious act, perhaps, but most certainly through the woful ignorance of the salesmen.

THIRD: Do you have a fair knowledge of pruning orange and lemon trees? Of long and short pruning of deciduous trees? Of types of pruning used for berries and vines? Of proper thinning on sugar-beets, cotton and strawberries? Of best methods of propping trees? The best method of smudging and a fair knowledge of tree surgery?

Do you know the approximate amount of irrigation required to mature a crop, plus the season's rainfall? Is it not a fact that on most of our orange groves, the same amount of water has been applied year after year, irrespective of the season's rainfall, size of trees, or the amount of fruit maturing on the trees?

Do you work with the farmer along the lines of using more or less irrigation, dependent upon the season's rainfall or size of crop?

There is no question but that excessive amounts of water are applied in some sections in California, and there is a great deficiency in others.

Do you recognize hard-pan and plow-sole?

Do you carry a soil auger to show the depth of rainfall penetration and the need of early, mid-season or late irrigation?

Do you know cultivation? Do you make a study of it by keeping up with what is being done elsewhere, or are you satisfied with what you find in your immediate district?

I venture to say that there would be a wide divergence of opinion relative to shallow and deep cultivation and sub soiling if each of you expressed his ideas on the subject today. Therefore, be

fortified with all the authority obtainable when questions are asked by your prospective customer, so that at least he will understand that you have made a study of the subject.

I have heard of a salesman stating to a customer that his grove required deeper cultivation, but when asked for a recommendation as to depth, the salesman was entirely at sea. In fact, all he knew of deep cultivation was that he had heard some one state that all groves should be cultivated deeper.

In my opinion, it is the duty of every one of you to not only work on the sales end of your business, but to keep abreast of the times and to constantly add to your fund of knowledge through studying not only field conditions, but to keep up with all well-known authorities.

Summing up then, what I have just spoken on, I would say your obligation to the customer is to leave no stone unturned in your endeavor to see that he makes a profit by the purchase of your goods. To sell him fertilizer with the malicious attempt to defraud, or through ignorance of the business by which a loss is sustained, amounts to practically the same thing so far as your standing with the customer is concerned and its attendant effect upon the industry.

(*To be continued*)

* * *

Am. Soil Survey Ass'n

(*From page* 12)

of one sub-group of group 1. They are characterized by at least three divisions of the profile, irrespective of their parent geologic formation. They are A, B and C. The outstanding or striking characteristics are—a layer of forest litter, a thin coating of humified soil which breaks very sharply into a gray horizon, below which lies a brown and somewhat heavier horizon and frequently loosely cemented together, especially in the sandy types. Below this brown horizon lies the parent material. In this northern province, of course, exist many soil types differing greatly in detail. One of the most important distinctions that can be made is between calcareous and non-calcareous soil and parent material.

E. B. Ferris, assistant director in charge of the South Mississippi Branch Experiment Station, in one of his experimental fields of cotton. The cotton in which Mr. Ferris is standing received an application of complete fertilizer in contrast with the adjacent plots receiving no fertilizer. This experiment has been running eight years

Coming Through the Alfalfa

(*From page 56*)

had been widened a bit each year until each one had appropriated a strip of considerable width.

It took plenty of elbow grease and some patience. While I was grubbing the osage hedge out, I seriously threatened to borrow a coat of armor from the town museum. The osage out, we had increased the tillable area of the farm by six acres. These acres produced the best crops we had and the added crop will just about pay the expense of grubbing the trees out.

We have just got our furnace in, we have a semblance of a water supply, new wall paper, paint and varnish have told their story and we have what will in a few years be a beautiful planting of ornamental shrubs around the house—and 60 acres of good alfalfa. Limestone, fertilizers, good seed, efficient livestock—blended with judgment, this recipe will put any farm, run-down or run out, where it can help the owner to develop a satisfactory farm home.

* * *

Virginia's Fertilizer School

(*From page 25*)

method of evaluating a fertilizer, both from the commercial and agricultural standpoints, based on the chemical analysis. The title of this paper was the Evaluation of a Fertilizer. The comparative value of different fertilizers as based upon the elements of plant nutrients contained was shown.

The address on Fertilizers for Virginia Crops, delivered by Dr. T. K. Wolfe, Agronomist, Virginia Polytechnic Institute, had as its basis the results of the fertilizer experiments conducted in Virginia and their application to farming conditions. The needs of the different soils and crops of Virginia so far as fertilizers were concerned were indicated. It was shown that all soils of Virginia need phosphorous for all crops, the heavy soils which have not been properly handled and the sandy soils need nitrogen and potassium in addition to phosphorous for the ordinary crops. In case of special crops such as tobacco and potatoes, even when grown on the heavy soils, a complete fertilizer is needed. The relation between soil type and the type of agriculture was indicated by means of a map of the State.

Professor George W. Patteson, Jr., Extension Agronomist, Virginia Polytechnic Institute, indicated the latest findings in reference to the fertilization of pastures and meadows in his address on Value of Fertilizers for Hay and Pasture Crops. He briefly outlined the characteristic needs of the hay and pasture plants in reference to soil, fertilizer and lime requirements.

In his address, Why We Use Fertilizers, Mr. W. F. Pate, Agronomist, Soil Improvement Committee, National Fertilizer Association, very fittingly related the reasons why fertilizers are used. He emphasized the value and necessity of using the right kind of fertilizers in the right amounts as the chief reason for the use of fertilizers was to secure profitable increases in yield.

The school was concluded by a visit to the experimental plats where the soil fertility experiments with wheat and lysimeter experiments were studied. Here the remarkable returns secured from the right use of fertilizers and the poor and unprofitable returns from the use of the wrong fertilizers were seen.

Change

(*From page 4*)

lesson. With the coming of radio for the home the market for batteries was tripled and quadrupled. Factories multiplied in every town, village and hamlet. Smoke-stacks belched flame far into the night. Haggard workers on overtime plugged along at their machines, exchanging needed hours of rest for the opportunity to swell their purses on time-and-a-half.

Then into their midst, like a Gargantuan monster, strode the battery-less radio. With a shriek of dismay, men making batteries rushed to cover, making hurried plans as they fled!

How can we have sympathy for men who rest their all on such scanty assurance as the fact that what is wanted today will be wanted tomorrow? Cannot these men read, think, hear? Are they unable to interpret past history in terms of the future?

OFTEN, we find that one industry warms in its bosom the child that will soon grow up only to slay its foster-parent.

Even now we have before us an example that is worthy of study, not for itself alone but because it points out a principle in this vast subject of change.

Last night I witnessed a demonstration of the new "talking films," the invention of Dr. Lee deForrest. On the silver screen before me was re-enacted a vaudeville skit with perfectly synchronized voices and movement. All that was lacking to make the reproduction perfect was the color of the original and a stereoscopic effect to add the planes which my eyes see but which the single plane of the silver sheet so far makes impossible. The demonstration took place on the moving picture screen of a vaudeville theatre, one of a new chain of forty just being erected by a group of financiers.

Had I been one of these financiers I should have gone home from that demonstration in sober thought—in fact, in fear and trembling for the future safety of my investment! Certainly, I should not have had the temerity to throw on the screen this: "If you like the Phono-films and would like to see and hear more of them in this theatre, let us know by your applause."

Naturally, hearing the enthusiastic, violent wave of applause that swept over the audience, I should first have been delighted that something new was in my hands to please my present audiences. But I fear that back in my mind would persistently have appeared the picture of where that audience of mine would be five or ten years from now! And that picture might clearly show the audience in their own homes—seated comfortably around a machine on the tiny screen of which was being thrown, by radio, a series of vaudeville acts, with sound and voice perfectly synchronized, with color realistically reproduced and with a stereoptican reality of planes that fairly put the original in the home—in motion!

Impossible? Does anyone have the temerity to say that such a development is impossible, after studying the past history of the progress of other inventions in the world?

Very well, then, I shall let you in on a secret! *Radio movies for the home, with sounds synchronized on the film are already a reality!* The man who says a thing cannot be done is always interrupted by someone who has already done it. Threatening the very soul of all

film-theatres and vaudeville houses, this invention gives in the home what formerly was possible only in the theatres.

From the time when David built the first tabernacle men have congregated together to hear a speaker, to witness a demonstration, to be amused or be educated. This congregating was necessary. How else could the speaker get his message over to a great group of people? But with the coming of the radio millions of folks in their own homes listen in comfort to a voice thousands of miles away. No longer is the congregating place necessary, as pastors who broadcast their sermons will tell you sadly.

Two hundred and fifty men board the Twentieth Century Limited at New York City each day—bound for Chicago. Each pays about fifty-five dollars for the privilege of being transported a thousand miles in twenty hours. They congregate on the same train because only in this way can they go that distance in such a short time for so little money.

But let a simple air-device, plane, cycle or other invention be perfected which will take a man, individually, to Chicago for about the same cost in about the same time—and watch the railroad travel drop.

Men and women attend the theatre today, paying five dollars for a seat to see a play. Why? Because only by presenting the plan before hundreds of witnesses, each theatre-goer thus paying his small, fractional share of the night's expenses, can the producers afford to invest the necessary money in salaries, scenery and rent. But let a device be perfected, which carries that play *to the home* for about the same price, and watch theatre patronage drop.

Men do not congregate together merely to enjoy each other's company. Parties of two in a theatre rarely speak to adjoining parties of four. Each party goes, sits, enjoys the spectacle, and returns.

So, we may soon witness a change—the bringing into the home of the amusement, replacing the sallying forth of the home-lovers to the places where now amusement is afforded.

"THE great world spins forever down the ringing grooves of change," said Tennyson, and Ovid, strumming a similar lyre, chanted, "There is nothing in the world that remains unchanged; all things are in perpetual flux, and every shadow is seen to move." But Byron pictures in a few short lines the saddest part of change—its effect on the fortunes of men:

"Ships, wealth, general confidence—
All were his;
He counted them at break of day,
And when the sun was set! Where were they?"

We do not object to change, if that change represents an improvement in our mode of living, if it broadens our outlook, helps pack into our short life a few more of the things for which we long. But when these changes affect us and our work, our livelihood, then we struggle and squirm.

None of us are immune to the effects which quick-coming changes make on the world of men. Some of these changes hit us unawares —we are unready for them, did not know they were coming. Others slowly undermine the solid terrain upon which we stand until suddenly we stand looking down into a chasm, fearfully.

The question for each of us to study is this: What changes could come in the near future which might affect materially my living, my work, my family?

Printing ink makers go along serenely, making ink, making money, making plans for the future, seemingly unaware that in a little laboratory a group of men are developing a method which eliminates the use of ink on the printing press by electrically carbonizing the paper pulp where the type hits it!

If they hear of the invention they laugh. And in just the same way carriage makers laughed at the first horseless carriage

Gasoline makers extend their filling station chains serenely, developing oil wells and increasing the size of distilleries seemingly unaware that many men are working on the problem of replacing gasoline with alcohol. If the gasoline men think of this countermovement or development in fuel they merely smile condescendingly, much as the suspender manufacturers smiled when told that belts would some day gain almost complete domination over galluses.

Automobile manufacturers proceed hastily to spread their giant plants to still greater proportions while a twenty-eight-year-old, financed by men of vision, demonstrates a model *electric* automobile with only fifty moving parts which gets its power through radio waves from a central station!

That anything could come of this invention seems beyond the realms of probability to these super-wise auto-makers, and they give the lad the same merry haw-haw that they, themselves, received when they first stuttered down the pike in the coughing Twin One of 1900!

Barbers, eight years ago, left their trade to take up other work, claiming that there was no money in it—other labor paid higher returns per hour. Now they wish they were back, for the coming of bobbed hair has cut the barbers' unproductive time in the average shop from 60 per cent to only 15 per cent, and barbers are making big money.

Grocers, watching the advent of the chain store, felt secure because of their personal hold on their trade. They overlooked the fact that huge buying power with its consequent reduction in prices over-the-counter more than offset any desire on the part of women to trade with men they knew.

Publishers, spending ninety cents out of every subscription dollar for sales cost, laughed with ill-concealed amusement at the first man to give his publication away; but when thirty, forty and fifty such magazines began to make sweeping headway against old traditions their laughter gave way to sober reflection.

Fertilizer manufacturers continue to make up their formulae of plant food based on certain well-established combinations of nitrate, potassium and phosphorus. Is there no possibility of discovering any additional incentives to plant growth?

CHANGES wrought by the advent of new inventions constitute only a portion of the total changes which the world sees. Men's minds change, habits alter and national consciousness veers with the coming of new generations.

To be able to study out in advance just what changes are next due to visit us is impossible. I admit it. But the proposition I leave is this:

Nothing is permanent. Do not expect solidity. Be prepared for abrupt altering of your life affairs. Get ready for the New. Keep your mind open. Do not laugh at small beginnings. Study the Past. Selah!

TRY THIS

Motor Cop (after hard chase): "Why didn't you stop when I shouted back there?"

Driver (with only five dollars, but presence of mind): "I thought you just said, 'Good morning, Senator'."

Cop: "Well, you see, Senator, I wanted to warn you about driving fast through the next township."—Middleburg Blue Baboon.

* * *

A woman's secret society has been formed in America, reports a London paper. It sounds impossible over here.—*Central European Observer.*

* * *

Motorists, riding near a farm orchard, stopped the car, got out, climbed the fence, and gathered a bag of apples.

To complete the "joke" they slowed down as they went by the farmhouse, and called out to the owner: "We helped ourselves to your apples. Thought we'd tell you."

"Oh, that's all right," the farmer called back. "I helped myself to your tools while you were in the orchard."—*DeLaval Monthly.*

* * *

Dan Smith says it's a good thing hens don't know what masons get for laying bricks.

NOT THAT KIND OF CHICKEN

"I suppose," queried the finicky city board, "that you hatch all these chickens yourself?"

"Nope," retorted Farmer Penfield, "we keep hens to look after them details."—*Legion Weekly.*

* * *

"And this, darling, is a stork."

"Don't be silly, mother. Don't you suppose I know there isn't any such thing?"—Prairie Farmer.

* * *

A MYSTERY TO HER

Fussy old gent (reaching for wallet): "How do you sell them red flannels, miss?"

Saleslady: "You got me, mister, I don't understand how we do it either."—Farm Life.

* * *

Fair Motorist—Really, I didn't hit you intentionally.

Irate Victim—What have you got that bumper on your car for if you aren't aiming to hit some one?"—*Pennsylvania Farmer.*

* * *

Customer: "Are you sure this suit won't shrink if it gets wet?"

Mr. Epstein: "Mine ffendt, effery fire company in dis city has squirted vater on dot suit."

* * *

The human machine is the only one that comes without a book of directions.

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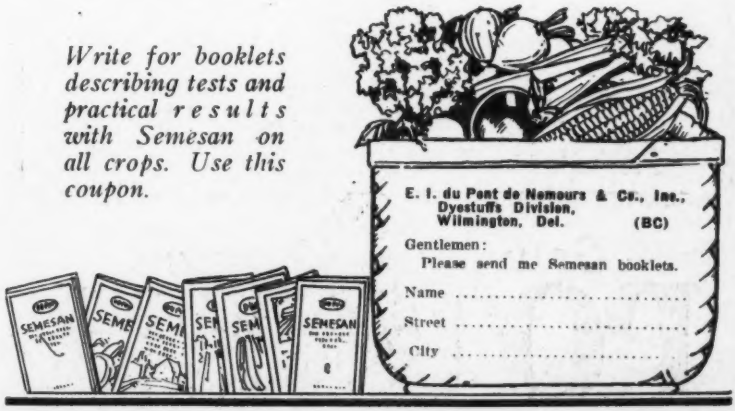

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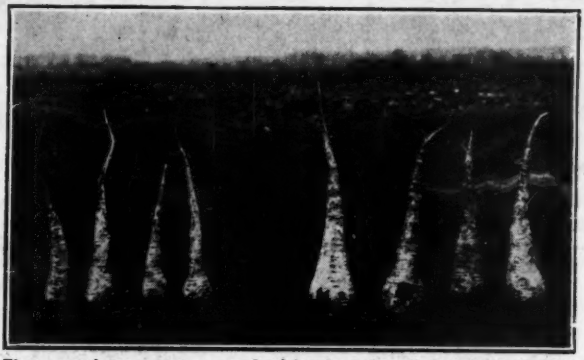

These parsnips were grown on 2 plots of muck soil just being brought under cultivation. Those on the left are from plot where no fertilizer was used and yield was 411 bus. per acre. Those on right are from plot where 200 lbs. of sulfate of potash was applied and yield was 483 bus. per acre.

If your name were stamped on every piece of produce you sell —

would you be proud or ashamed? Are your crops of the quality that brings good prices and repeat orders . . . or must they be sold wherever possible for whatever you can get?

Quality is not a matter of luck. Every season brings fresh proof of the great benefit in both yield and quality that results from proper fertilization. The table at the right shows how the sugar content of certain crops grown on muck soil was affected by different fertilizer treatment. The percentage of sugar in these crops is a good index of their quality. Note the improvement where potash was applied.

There are many other proofs of how greatly you can control the quality of your crops by following a sound plan of soil management adapted to your special soil and crop needs. Consult your county agent or state experiment station and follow their advice.

Effect of fertilization on yield and quality of certain root crops on muck soil (Michigan Agricultural Experiment Station.)

Fertilizer Application	Table Beets Av. 3 yrs.	Table Carrots Av. 3 yrs.	Parsnips 1924 1 year	Onions—1924 1 year	
	% Sugar	% Sugar	% Sugar	% Immature Onions	% Sugar immature Onions
No Fertilizer	4.2	2.2	9.2	42.1	0.8
Phosphoric Acid	4.5	2.3	9.0	8.5	1.2
Potash	6.9	3.1	6.7	9.3	1.2
Phosphoric Acid and Potash	6.2	3.2	8.0	3.4	1.0
Complete Fertilizer	6.3	—	7.6	1.4	1.2

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